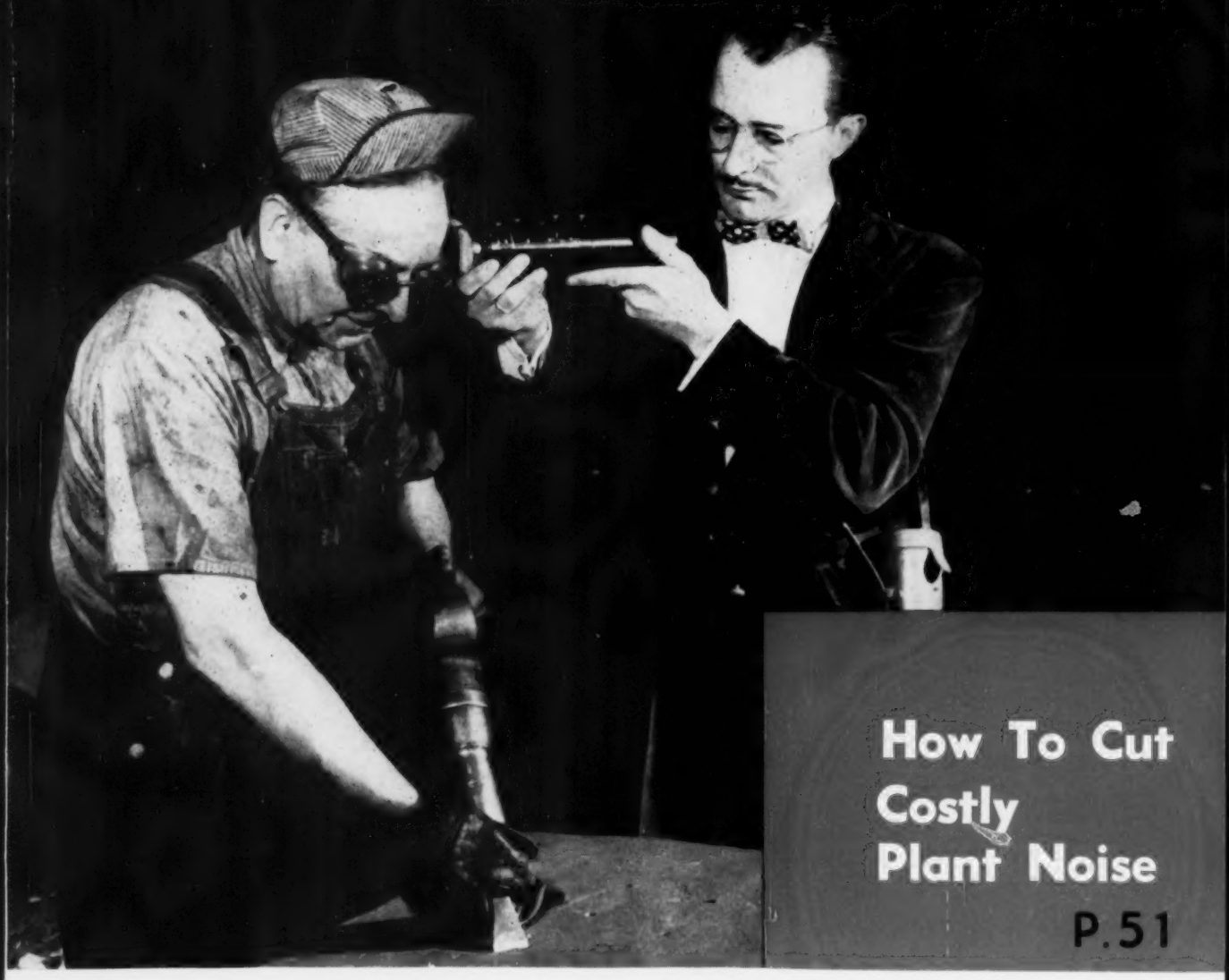
February 21, 1957

The IRON AGE

The National Metalworking Weekly



How To Cut Costly Plant Noise P.51

College Bottleneck Cuts Tech Grads P.54

Centerless Brushing Finishes Parts Faster P.91

Digest of the Week P–2

FOR ACCURACY!

Chromel-Alumel thermocouple alloys are unconditionally guaranteed to register true temperature—e.m.f. values within close specified limits . . . ±4°F. from 0° to 530°F.; ±¾% at operating temperatures from 531° to 2300°F.

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FOR ECONOMY!

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Chromel-Alumel thermocouple alloys are produced exclusively by

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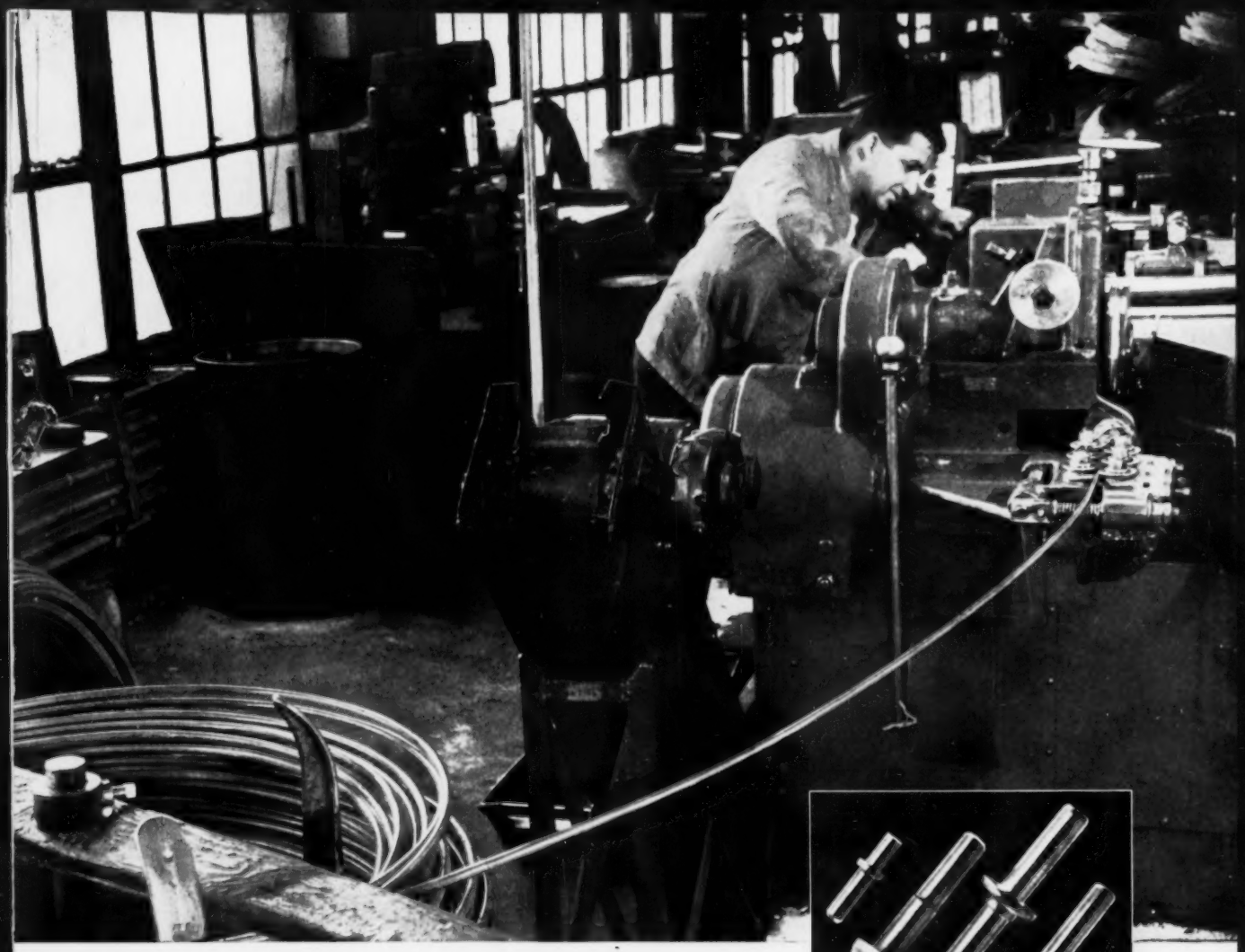

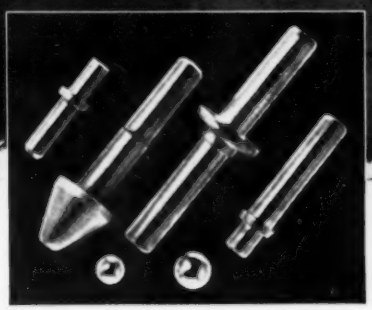

COLD-HEADED FROM STEEL WIRE

At the right is a group of parts cold-headed by The Bassick Company, Bridgeport, Conn., from Bethlehem Cold-Heading Wire.

A leading manufacturer of casters, The Bassick Company also makes chair controls, automotive hardware, and other products. We have been supplying them with cold-heading wire for years. Production men at Bassick speak highly of the care Bethlehem exercises in making wire to meet their various requirements.

Steel wire for cold-heading is a Bethlehem specialty. Cold-heading wire has to withstand a lot of punishment — upsetting, extrusion, slotting, punching, pointing, and other operations. And when heat-treating follows cold-heading, the steel must respond properly to carburizing and other hardening treatments. Uniform gage and composition of the steel are of the highest importance always.

There are many other points which we watch carefully. Proper internal soundness and freedom from injurious surface imperfections are of special importance, because heading operations may cause even minor flaws to open up into wide cracks.

One of our technical men will be glad to discuss steel wire with you — whether you are planning to use wire for cold-heading or for some other application. Bethlehem makes nearly all kinds of steel wire. Let our nearest sales office give you full details.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

DIGEST OF THE WEEK IN METALWORKING

Feb. 21, 1957—Vol. 179, No. 8

The IRON AGE

Digest of the Week in Metalworking

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NEWS DEVELOPMENTS

TECH SCHOOLS FIGHT ENGINEERING BOTTLENECK P. 54

Few qualified students are turned down by tech schools as yet. But growing population and demand for

more engineers indicates a bottleneck in years ahead.

IS THERE A MAD MARKET IN EXECUTIVES? P. 55

Many firms, unable to develop enough homegrown executive talent, are going outside to recruit it, survey shows. It all leads to a tight market for management personnel. Companies with their own development programs are in better shape.

LONG-RANGE PERSONNEL PROBLEMS ARE AHEAD P. 56

It looks like a quiet interval in labor relations. But long-term outlook shows pitfalls. Problem is to increase productivity to meet demands, while keeping costs under control. Problem is aggravated by shortage of management talent.

STEEL MILLS DROP THE OTHER PRICE SHOE P. 57

And steel users this week are still busy toting up the cost. A large electrical equipment maker figures the average boost since last August's base price rise at $5.20 a ton.

EXCESSIVE plant noise is more than a minor irritation. It's estimated that it costs industry more than $4 million a day in efficiency loss alone. This week's Special Report, starting on P. 51, tells how to cut plant noise, avoid costly damage claims.

OPENHEARTHS: PREFABRICATION CUTS DOWNTIME P. 62

Engineers at U. S. Steel's Geneva Works cut downtime in half by prebuilding eight furnaces on flat cars outside the openhearth shop. On one, even the brickwork was prefabricated. Locomotive was equipped with push-button rheostat controls for slow, safe moving job.

FEATURE ARTICLES

WHY CENTERLESS BRUSHING FINISHES FASTER P. 91

Centerless power brushing may be what you need to revive a sluggish finishing line. It's fast, fits well in mass production. Brushes are able to finish parts to a few microinches at low cost. High part volume is easy to get. If through-fed, parts emerge from machine without slowing down, and absence of chucks cuts loading and unloading time sharply.

NO-MIX EPOXY JOINS METALS FAST P. 94

Epoxy adhesives for metal joining are well accepted in aircraft circles. Some are especially suited for low-cost, high-volume joining on a number of other jobs, in spite of opinions to the contrary. One such adhesive spreads directly from the can. It cures to a strong bond without additives.

ABRASIVE CUTTER SLICES TOUGH ALLOYS P. 96

Today's crop of tough new superalloys is just a taste of what is to come. Their usefulness depends largely on how well they can be fabricated. One cutting medium that is destined for big things in this field is abrasives. For example, Haynes Stellite Co. is using an abrasive cut-off machine that bites through 3-in. thicknesses of alloy at 4 to 6 sq in. a minute.

STEEL CASTINGS ENDURE WEAR AND IMPACT P. 100

Castings of a new alloy steel combine wear and impact resistance to an unusual degree. They don't bend or break. They wear out evenly and slowly. Proving ground for this new steel has been hard-rock mining, where castings take some of the roughest beatings imaginable.

WELD QUALITY RIDES WITH STEEL SELECTION P. 105

No manufacturing method, and certainly not welding, is an island unto itself. Each is influenced by other factors. Steels, even of similar analyses, exhibit many differences. Each affects weld quality. The welder, therefore, should develop an easy familiarity with steels. It will help him do a better job.

MARKETS AND PRICES

CHRYSLER MAKES TURBINE ENGINE HEADWAY P. 68

Chrysler Corp. announces that it is doubling its laboratory space for research and increasing its staff. It might be a tipoff that the company is drawing closer to production of a gas turbine engine.

DEFENSE DEPT. HITS DISUNIFIED SUPPLY SYSTEM P. 73

An inventory that took 11 years shows more than 3 million items in supply systems of military services. Standardization is the next step. But the Pentagon will have to overcome resistance to change. Services are reluctant to scrap their present systems.

GUIDE TO METALWORKING SALES IN THE FARWEST P. 75

The area's new plants and expanding ones are good prospects to buy metalworking's materials, products and services. Here's the latest rundown on new firms and those who are enlarging facilities.

MACHINE TOOL PESSIMISTS ARE SCARCE P. 77

At least two Cleveland machine tool producers are encouraged by the 1957 outlook. One big factor is the number of small plants in the market. Planned replacement begins to take hold, with good sales results.

STEEL CUSTOMER IS IN BETTER POSITION P. 135

Sheet and strip users are in a position to call the tune for their suppliers. But plate and structural consumers are in no better shape. Changing market and inventory conditions make the difference.

NEXT WEEK:

HOW FAR HAS MACHINABILITY TESTING MATURED?

If you machine metal, do you know your machining is efficient? Science of machinability testing has come a long way. Next week's Special Report tells of progress in this field, what it may mean to your company.

SIMPLIFYING HEAT EXCHANGER AND CONDENSER FABRICATION

The ease with which heat exchanger and condenser tubes can be rolled into tube sheets depends, to a certain extent, upon the uniformity of tube wall. One of the controlling factors of wall uniformity in the manufacture of seamless steel tubing is the contour of the piercer point.

Phil Morrison, a piercer point man, is shown at work on one of B&W's seamless tube mills. One of his duties is to examine the piercer point between each tube making operation. By making certain that the point has not been deformed in service—and that takes experience and a practiced eye—he helps to control wall uniformity in the pierced tube. He knows that although hot and cold work after the piercing operation can minimize, it cannot eliminate non-uniformity of wall section.

Phil's attention to detail, teamed with specially designed piercing equipment, helps to achieve the quality—"ease of rolling-in"—for B&W Heat Exchanger and Condenser Tubes. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.

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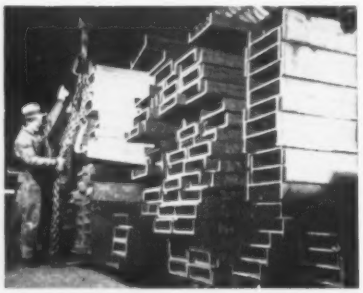
STEEL BUYERS GUIDE to Ryerson Products and Services

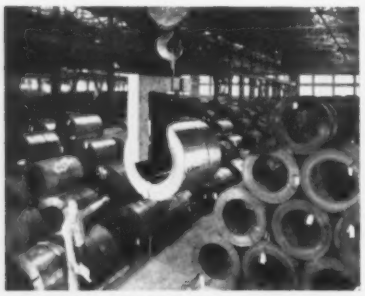
You can draw on your nearby Ryerson plant for an almost endless number of products and services—and the more you concentrate your purchases at one source, the more you save. Ryerson products not pictured here include: Re-bars, expanded metal, grating, plastic pipe, machinery and tools, etc. See your Ryerson catalog for complete list and write for descriptive literature.

BARS—The most complete range of types, shapes and sizes as well as the largest tonnage.



STRUCTURALS — I-beams, H-beams, channels, angles, tees and zees—all to ASTM spec. A-7.

PLATES—14 types including special low carbon plates for forming and welding, leaded New E-Z-Cut, etc.



SHEETS & STRIP—More than 20 different types in pattern sizes, cut-to-order sizes, strip coils, etc.

TUBING—Seamless and welded mechanical tubing, fluid power tubing, structural and boiler tubes, etc.

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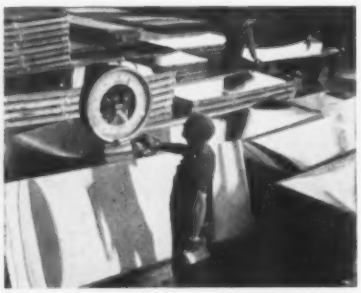
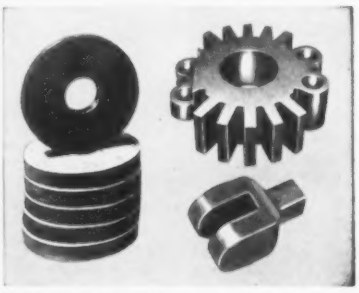
ALLOYS—Every type including leaded alloys for fastest machining, all performance-proved by tests.



STAINLESS—Allegheny stainless in over 2,221 sizes, shapes, types, finishes: sheets, plates, bars, pipe, etc.



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Indexed in the Industrial Arts Index and the Engineering Index.

BPA NBP

EDITORIAL

Be-Kind-to-Businessmen Week

◆ WALK QUIETLY. Don't use the word "depression." Be an understanding fellow. Keep out of the boss's way this week. If he gets any more new-fangled ideas on the economy he will be ready for the psychiatrist's couch. That would be bad for all of us.

The head of your company is trying to cut costs, to bring out new products and services, and to beat the competition. To do that and still keep the job of president isn't any cinch.

There are a lot of other reasons why this isn't as easy as rolling off a log. In the past 30 days, here are just a few of the things that have caused your man's ulcer to erupt:

¶ The Secretary of the Treasury has warned that we are in for a hair-curling depression if government spending isn't cut.

¶ Former President Hoover got into the act and indicated that he "felt" there was a depression in the making.

¶ President Eisenhower momentarily waved the spectre of controls over wages and prices! Business shuddered.

¶ The Secretary of Commerce took the President off the hook and tried to uncurl the Treasury Secretary's hair.

¶ The Chairman of the Federal Reserve Board insisted that our No. 1 enemy is inflation; that the FRB was lenient (sic).

¶ Senator Symington insisted our No. 1 enemy is Russia and that her airpower would overtake us if we lagged any more.

¶ The President by inference suggested Senator Symington did not quite know all the facts.

¶ The stock market behaved like a fever thermometer. After each drop it had to digest other statements—and stories.

¶ The I-told-you-so's have come out in all their goriness with dank, dark forecasts.

All these things have happened while the normal bag of troubles kept multiplying at a faster rate each week.

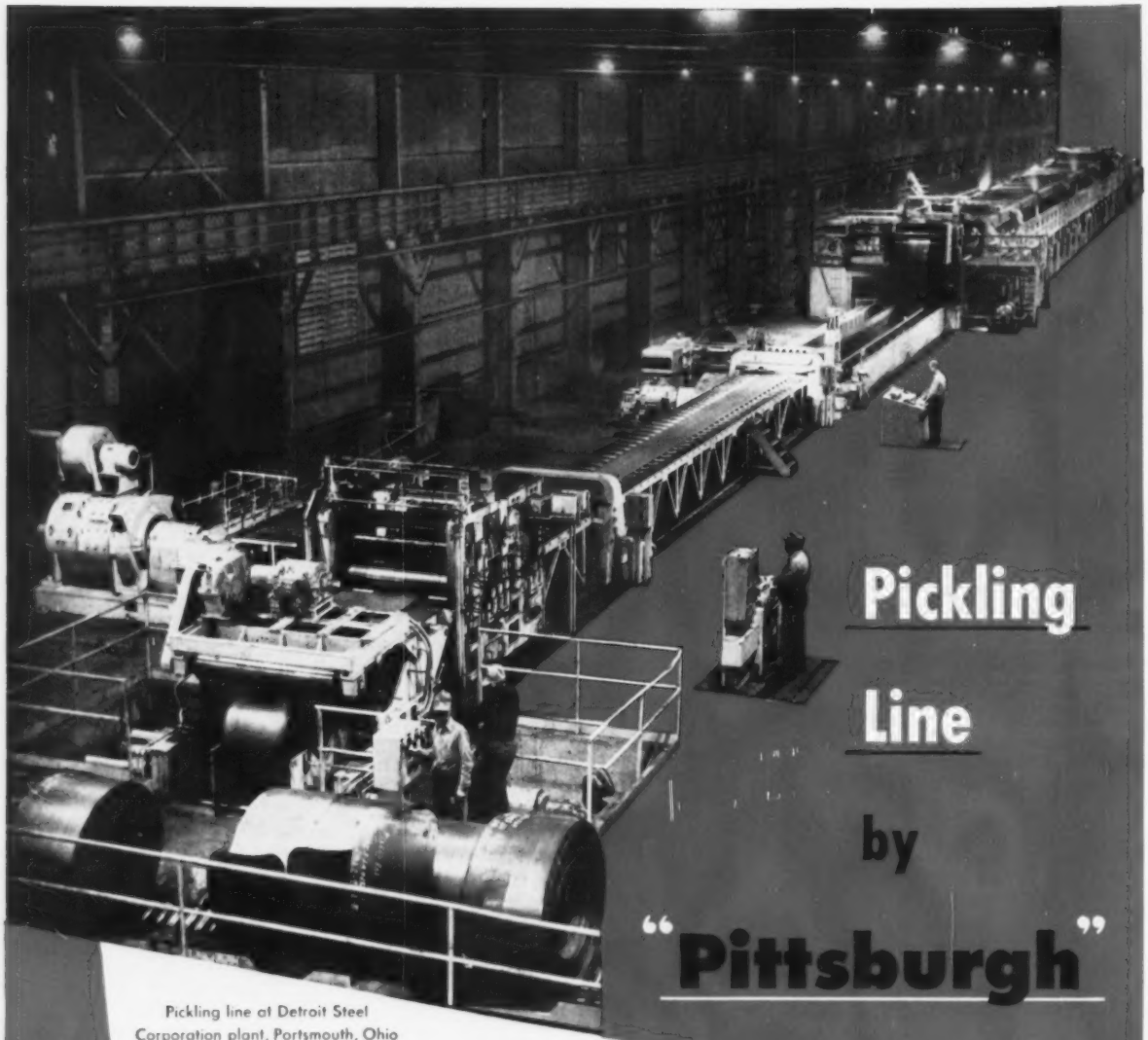
This zany batch of gratuitous advice came at a time when your head-man already was confused about the outlook.

Is it any wonder your company's president is having trouble sleeping? And, to cap it all, the Board wants another record.

Give the boss a break this week!

Tom Campbell

EDITOR-IN-CHIEF



Pickling line at Detroit Steel Corporation plant, Portsmouth, Ohio

Pickling Line by "Pittsburgh"

■ Major installations by Pittsburgh Engineering & Machine Co. in the plants of leading steel producers are noted for superior design and efficient operation.

Customer satisfaction with our products is based on many factors including our complete facilities for design, fabrication, machining, and installation.

Call on our engineering team for estimates on primary or auxiliary steel mill equipment.

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dear editor:

letters from readers

Ten Commandments

Sir:

Your editorial in the Jan. 3 issue of THE IRON AGE is one of the best expressions of the businessman's ten commandments that has come to our attention in a long time.

Would it be possible to secure 15 copies of this editorial page? *L. E. Collins, The Union Metal Mfg. Co., Canton, Ohio.*

Copies are on the way.—Ed.

Steel Arm

Sir:

I have held the article, "Are Warehouses Steel's Top Customer?" from your Nov. 29 issue hoping to write you about it.

There are naturally two viewpoints: one, that the warehouses are steel's top customers; two, that the warehouses are a part of the steel industry.

Personally, I believe the steel industry and perhaps all industry would fare better if the warehouses were considered a part of the steel industry and not separated—with the emphasis on the middleman. The vast majority (in numbers, not tonnage) naturally purchase from the steel warehouses. Would it not be better to consider that they are buying from a steel company which is a part of the great steel industry? Wouldn't the steel industry be strengthened by this unity? *K. J. Evans, Marketing Consultant, Joseph T. Ryerson & Son, Inc., Chicago, Ill.*

We agree—warehouses are an arm of the steel industry.—Ed.

Safety First

Sir:

Your article concerning the new safety code for grinding wheels on p. 60 of the Jan. 24 issue of THE IRON AGE has been read with considerable interest. The article is well written and I know will do a great deal to promote safety in the use of grinding wheels. We wish to thank you and your magazine for including an article of this type. *E. W. Farmer, Adv. Mgr., Bay State Abrasive Products Co., Westboro, Mass.*

Lease or Buy?

Sir:

We are very much interested in the article "Company Cars: Should You Lease or Buy?" by T. M. Rohan in the Jan. 17, 1957 edition.

Could you furnish us with the names of leasing concerns in this area? *F. L. Bartlett, Medium Steam Turbine, Generator and Gear Dept., General Electric Co., W. Lynn, Mass.*

We understand that a reputable auto rental firm in the Boston area is Auto Rental Corp., Gold Star Blvd., Worcester, Mass.—Ed.

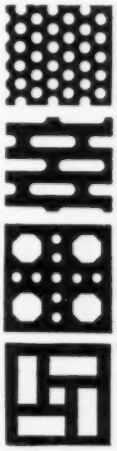
THE IRON AGE

"I bet five bucks he can't outrun a sheet of steel!"

For the top three floors of the beautiful new Socony Mobil office building in New York City, we furnished more than 40,000 sq. ft. of perforated stainless steel wall panels.

from Sky Scrapers to Spin Driers and Juke Boxes

What do YOU require in Perforated Metal? Already there are thousands of established applications and new requirements are developing every day . . . in such fast growing fields as Air Conditioning, Atomic Energy, Aviation, Chemical Processing, Electronics, Household Appliances, Noise Control, Smoke Abatement, Space Heating, etc.



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Los Angeles Area

The same trucks that do the stacking also transport appliances from end of assembly line to storage, and from storage to loading docks. Two-way radio dispatch system expedites movement.

13 BAKER TRUCKS give General Electric Appliance Park "floor-to-ceiling" utilization of warehouse space!

Every cubic foot of storage space in this mammoth appliance warehouse is utilized by compact stacking. Baker Trucks, equipped with a special lift attachment that handles cartons or crates without forks, help do the job.

General Electric has a fleet of 13 such trucks at this installation and is adding 5 more. This new concept in appliance handling completely eliminates the use of pallets—which would have meant an additional investment 8 or 9 times the cost of the trucks. The absence of forks and pallets makes possible stacking one tier higher and reduces aisle space required, thus increasing storage capacity more than 25%.

The trucks have a total lift of 242 inches. Appliances are handled 4 per load for the bottom 2 tiers, and 2 per load for upper tiers. Gravity sliding back-rest aligns loads perfectly with tiers below and protects them from impact damage. Side-shifter butts loads snugly against adjacent stack for lateral alignment.

A Baker handling engineer can help you devise similar cost-saving methods in your plant or warehouse. Call your nearest Baker representative or write us direct.

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Otis
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fatigue cracks

Bach and Industry

This week's Special Report is on the costly effects of industrial noise.

It's always been our guess that our editors, who have a classic turn of mind, are equally at home in the type of writing that is punctuated with Latin phrases such as "quod erat faciendum," "sine qua non," and loaded down with "et hoc's."

Enter Back

This suspicion was confirmed when the story, starting on p. 51, was preceded by the following:

"'Bach!' said Lord Edward in a whisper.

"Pongileoni's blowing and the scraping of the anonymous fiddlers had shaken the air in the great hall, had set the glass of the windows looking on it to vibrating; and this in turn had shaken the air in Lord Edward's apartment on the further side. The shaking air rattled Lord Edward's membrana tympani; the interlocked malleus, incus, and stirrup bones were set in motion so as to agitate the membrane of the oval window and raise an infinitesimal storm in the fluid of the labyrinth. The hairy endings of the auditory nerve shuddered like weeds in a rough sea; a vast number of obscure miracles were performed in the brain, and Lord Edward ecstatically whispered 'Bach!'"—Aldous Huxley, Point Counter Point.

But, as it was pointed out, Bach is rarely heard in metalworking plants. The sounds of industry are on a different scale. What's music to a production manager's ears may show up fortissimo on the final cost sheet.

That's why the report on "How To Cut Costly Plant Noise" may be important to you. It could help you cut back that "fortissimo" to "pianissimo."

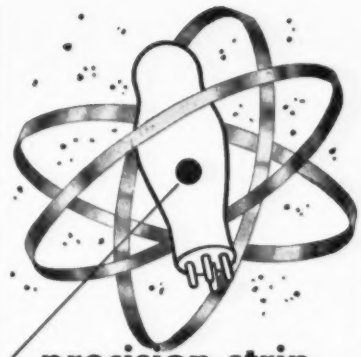
Puzzlers

We would call the train puzzle a real doozer. So did everybody else. But Jim Mull, The North American Manufacturing Co. came through with the doozer to end all doozers.

Just to aid in keeping the solution clear, let's assume the trains are running on a north-side track. I propose that the train headed south pull on to the siding which will accommodate the first half of the train. The south bound train is uncoupled at the middle, leaving the first half of it on the siding out of the way, and the last half still on the main track without an engine. The north bound train then proceeds north on the main track to the north end of the siding, at which point the engine couples on to the last half of the south bound train and shoves that half back north ahead of engine until rear of north bound train has cleared southern end of the siding.

The south bound engine, with half a train, pulls on to the main track and proceeds far enough south to get out of the way. The north bound train then backs south with the switches set in such a manner that the cars of the north bound train back on to the siding through its entire length and back on the main track. The engine continues in this manner until it reaches the southern end of the siding with 1,000 feet of its own cars stretching behind it on the main track and 500 feet of the other train's cars ahead of it on the siding. The north bound engine then uncouples the south bound cars from its front and proceeds north, pulling its own cars behind it.

At this time the south bound engine, with a half a train, backs north to the south end of the siding, couples up the second half of its string of cars and then proceeds south on its way. This makes the passing with two uncouplings, two couplings, and two backings.



precision strip
for electronics applications

From 0.0005 in. to 0.040 in. thick and 0.090 to 6 in. wide, these alloys are available as special-tolerance strip:

Beryllium Copper
Phosphor Bronze
Nickel Silver
Brass
Chromium Copper
Stainless 17-7PH
Invar
Magnetic: High Nickel

Some immediately available. Others rolled to order in 2 to 21 days. Can be supplied in coils or straight lengths with slit or filed edges—also cadmium plated.

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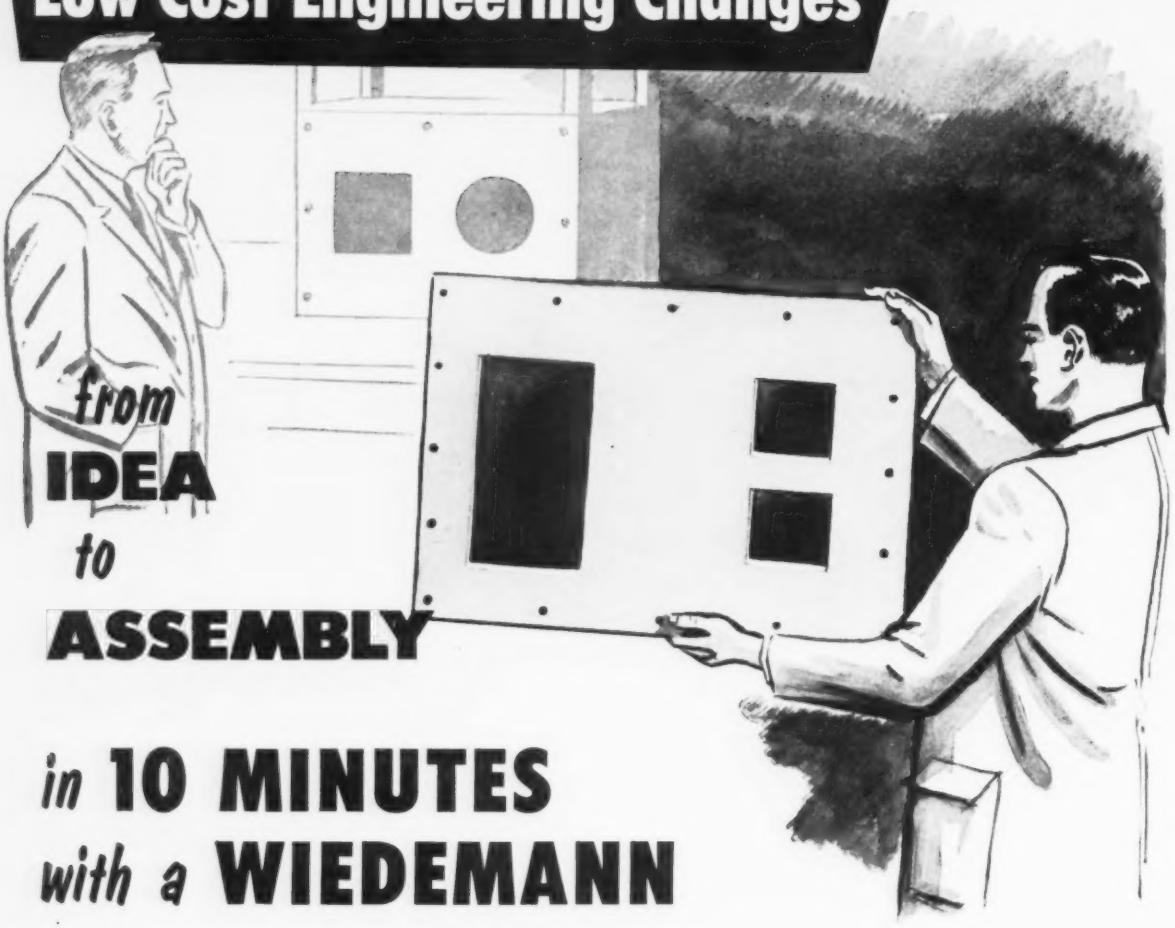
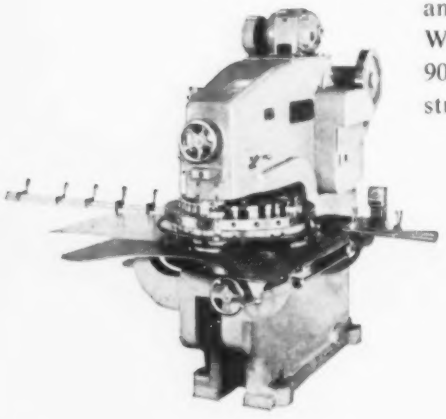
Low Cost Engineering Changes



in 10 MINUTES with a WIEDEMANN

When the job on the left was assembled, the need for engineering changes in the mounting plate was evident. Greater rigidity was required. Openings were of wrong size and incorrectly placed. Hours of valuable production time could have been lost—but, using a Wiedemann Turret Punch Press, the new part was ready for assembly in less than 10 minutes after the change was ordered.

Whether simple or complex, on-the-spot engineering changes can be made at amazingly low cost. This is just one of the many ways the Wiedemann Method cuts short run piercing costs 60% to 90%. Want proof? Send drawings of your work for a time study and write for Bulletin 201.



There's a Wiedemann for every short run piercing requirement.

WIEDEMANN MACHINE COMPANY

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dates to remember

FEBRUARY

American Institute of Mining, Metallurgical and Petroleum Engineers—Annual Meeting, Feb. 24-28, Roosevelt and Jung Hotels, New Orleans, La. Society headquarters, 29 W. 39th St., New York.

MARCH

American Institute of Chemical Engineers — National meeting, March 3-6, The Greenbrier, White Sulphur Springs, W. Va. Society headquarters, 25 W. 45th St., New York.

Society of Automotive Engineers, Inc.—National passenger car, body and materials meeting, March 5-7, Sheraton-Cadillac Hotel, Detroit. Society headquarters, 485 Lexington Ave., New York.

EXPOSITIONS

1957 Nuclear Congress—March 11-15, Philadelphia.

American Society for Metals—March 25-29, Los Angeles.

American Foundrymen's Society—May 6-10, Cincinnati.

American Machine Tool Distributors' Assn.—Spring meeting, March 6-7, El Mirador Hotel, Palm Springs, Calif. Assn. headquarters, 1900 Arch St., Philadelphia.

Pressed Metal Institute — Technical meeting, March 6-8, Hotel Carter, Cleveland. Society headquarters, 3673 Lee Rd., Cleveland.

National Assn. of Waste Material Dealers, Inc.—Annual convention, March 10-13, Hotel Conrad Hilton, Chicago. Assn. headquarters, 271 Madison Ave., New York.

Steel Founders' Society of America—Annual meeting, March 18-19, Drake Hotel, Chicago. Society headquarters, 606 Terminal Tower, Cleveland.

American Institute of Mining, Metallurgical and Petroleum Engineers, Inc.—Regional meeting, March 18-19, Rackham Bldg., Detroit. Society headquarters, 29 West 39th St., New York.

APRIL

The American Society of Mechanical Engineers—Spring meeting, April 8-10, Dinkler-Tutwiler, Birmingham, Ala. Society headquarters, 29 W. 39th St., New York.

American Society of Lubrication Engineers—Annual meeting, April 15-17, Sheraton-Cadillac Hotel, Detroit. Society headquarters, 84 E. Randolph St., Chicago.

Specify *Michigan* Tubing for economy and versatility

A Quality Product

ROUND

¼" to 4" O.D. 7 to 22 gauge

SQUARE	Gauge	RECTANGULAR
⅜" to ¾"	16 thru 22	⅜" minimum side to 5" maximum side
¾" to 1"	11 thru 22	
1" to 2"	11 thru 20	
2" to 3"	11 thru 18	

Carbon 1010 to 1025

Standard Sizes

Tube Diameter O.D. Size	Maximum Wall Decimal	BWG Gauge	Minimum Wall Decimal	BWG Gauge
¼	.065	16	.022	24
⅓	.083	14	.022	24
⅜	.095	13	.022	24
½	.095	13	.022	24
¾	.095	13	.028	22
⅞	.095	13	.028	22
1	.095	13	.028	22
1⅛	.095	13	.028	22
1¼	.095	13	.028	20
1⅜	.095	13	.035	20
1½	.120	11	.035	20
1⅝	.120	11	.035	20
1¾	.120	11	.035	20
1⅞	.180	7	.035	20
2	.180	7	.035	20
2⅛	.180	7	.035	20
2¼	.180	7	.035	20
2⅜	.180	7	.035	20
2½	.180	7	.035	20
2⅝	.180	7	.035	20
2¾	.180	7	.035	19
2⅞	.180	7	.042	19
3	.180	7	.042	19
3⅛	.180	7	.042	19
3¼	.180	7	.042	18
3⅜	.180	7	.049	18
3½	.180	7	.049	18
3⅝	.180	7	.049	18
3¾	.180	7	.049	
3⅞	.180	7		
4				

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Michigan has been manufacturing tubular parts for leading manufacturers. This acceptance of Michigan tubing has been won by meticulous attention to customer requirements and the supplying of the very best in tubing. The following advantages of low cost manufacture and utmost dependability are yours when you specify Michigan for tubular parts in the fabrication of your products:

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4. **Complete facilities for the COLD DRAWING, ANNEALING and TESTING of tubing we manufacture.**

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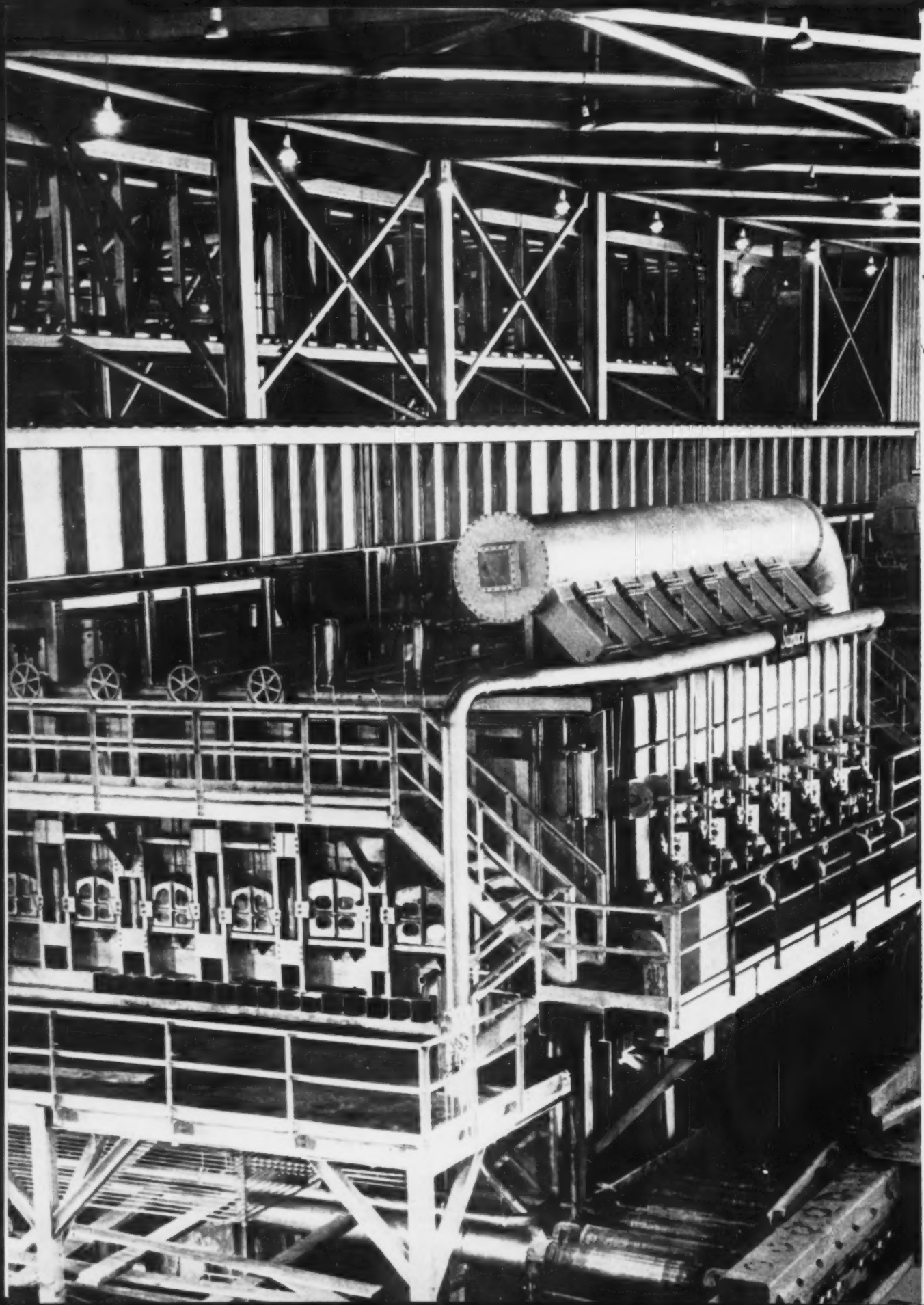

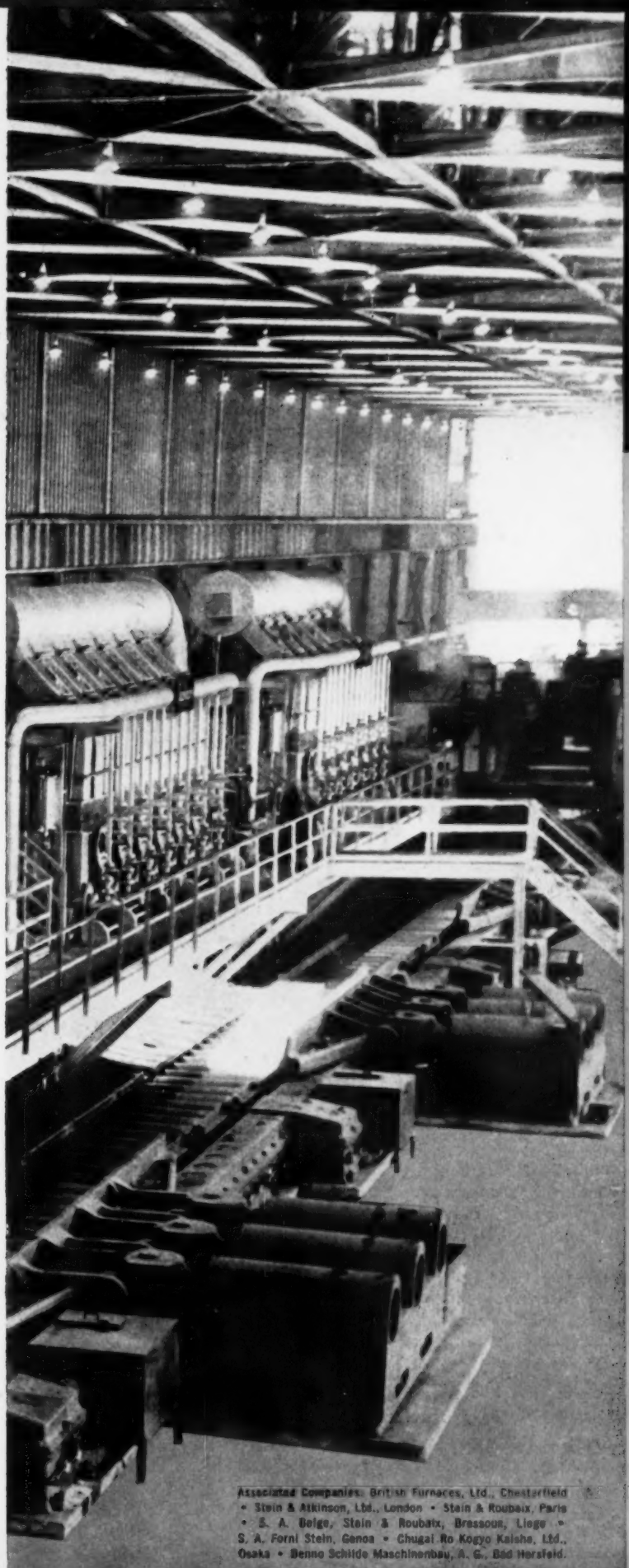

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200 TONS AN HOUR CONTINUOUSLY

200 tons of steel slabs are heated to rolling temperature every hour, continuously, in each of these Surface monsters—world's largest slab furnaces.

No other furnace today can list all of these features:

1 Cantilever skid supports* permitting unobstructed combustion space for underfiring.

2 Furnace lines and burner design which provide high heat input from the moment the slab enters the furnace.

3 Built-in control* to prevent intermingling of gases from upper and bottom zones, providing better control of heat application, and preventing overheated slab end.

4 Anticipatory control which reduces temperature head when rate of slab discharge decreases.

5 Air preheat up to 1100°F.

6 Television signal to pusher pulpit, informing operator of the exact position of the leading slab.

About the only conventional feature in these giants is the fact that the slabs are pushed in one end and out the other.

This is another demonstration that, at Surface, unconventional thinking and conventional experience are a productive team for the steel industry. Surface Combustion Corporation, Toledo 1, Ohio.

*patents pending

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Real tension on this job!

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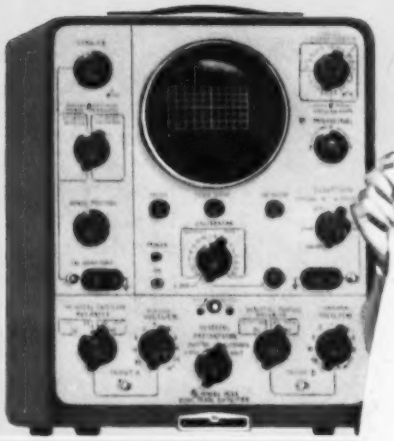
A woman's place is in the home?



HEWLETT-PACKARD'S NEW, MODEL 150 OSCILLOSCOPE

Not any more... and Hewlett-Packard Instruments project them into highly technical occupations!

But no matter who operates them, it *is* logical that Hewlett-Packard's ability to design their complex, electronic instruments would be reflected in their demand for efficient and economical assembly methods.

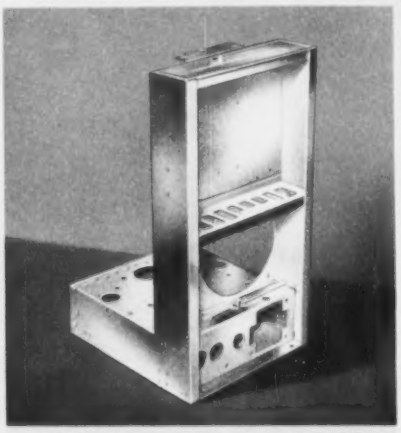
That's why, almost without exception, Hewlett-Packard depends on Sciaky resistance welding techniques and equipment to satisfy their rigid specifications for fastening—aluminum cases of all sizes and shapes . . . complex chassis assemblies . . . even precision variable condenser stators and rotor assemblies.

Putting the profits back into manufacturing is the Sciaky concept of design. So, whether or not *you* make instruments—assemble the metal pieceparts of *your* product to best advantage with Sciaky resistance welding techniques—like Hewlett-Packard does!

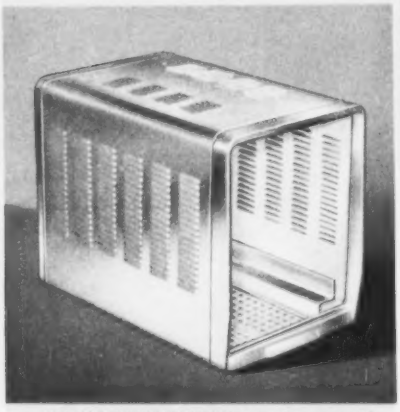
SCIAKY®

Largest Manufacturers of Resistance Welding Machines in the World

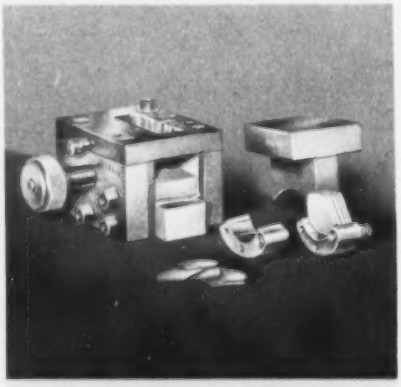
Maybe the details of Hewlett-Packard's operation on the next page will help you improve your own



OSCILLOSCOPE CHASSIS—resistance welding 12 piece parts of 14 and 12 ga. 52S aluminum; 80 spot welds per chassis; 40 chassis per day with two welders.



SIGNAL GENERATOR CABINET—resistance welding 8 piece parts, 14 ga. 52S aluminum and cast bezel; 55 welds per cabinet; 16 cabinets per hour with two welders.



VARIABLE CONDENSER—projection welding 6 piece parts to high accuracy in one stroke; 350 condensers per day with two jigs, one operating, one loading.

Sciaky Resistance Welding Techniques increase production 150%

Better product quality, easier assembly are additional benefits

For Hewlett-Packard Company, Palo Alto, California, leading electronic instrument manufacturer, Sciaky Resistance Welding Techniques have provided four basic cost cutting production advantages—

1. **Increased production—as much as 150%.**
2. **Elimination of fit-up problems of riveting.**
3. **Simplified quality control procedures.**
4. **Adaptability of equipment to pilot runs without costly tooling.**

So successful have Sciaky Resistance Welding Techniques been —even on jobs where other equipment failed—that Hewlett-Packard is now designing all new products for Sciaky Resistance Welding. And old products are being redesigned to take advantage of this economy, too.

Described at the right are a few of the jobs being done at Hewlett-Packard with Sciaky Resistance Welding Techniques *designed to put the profits back into manufacturing.* These and other jobs are described in greater detail in "Resistance Welding at Work," Vol. 5, No. 2. Write for your free copy today.

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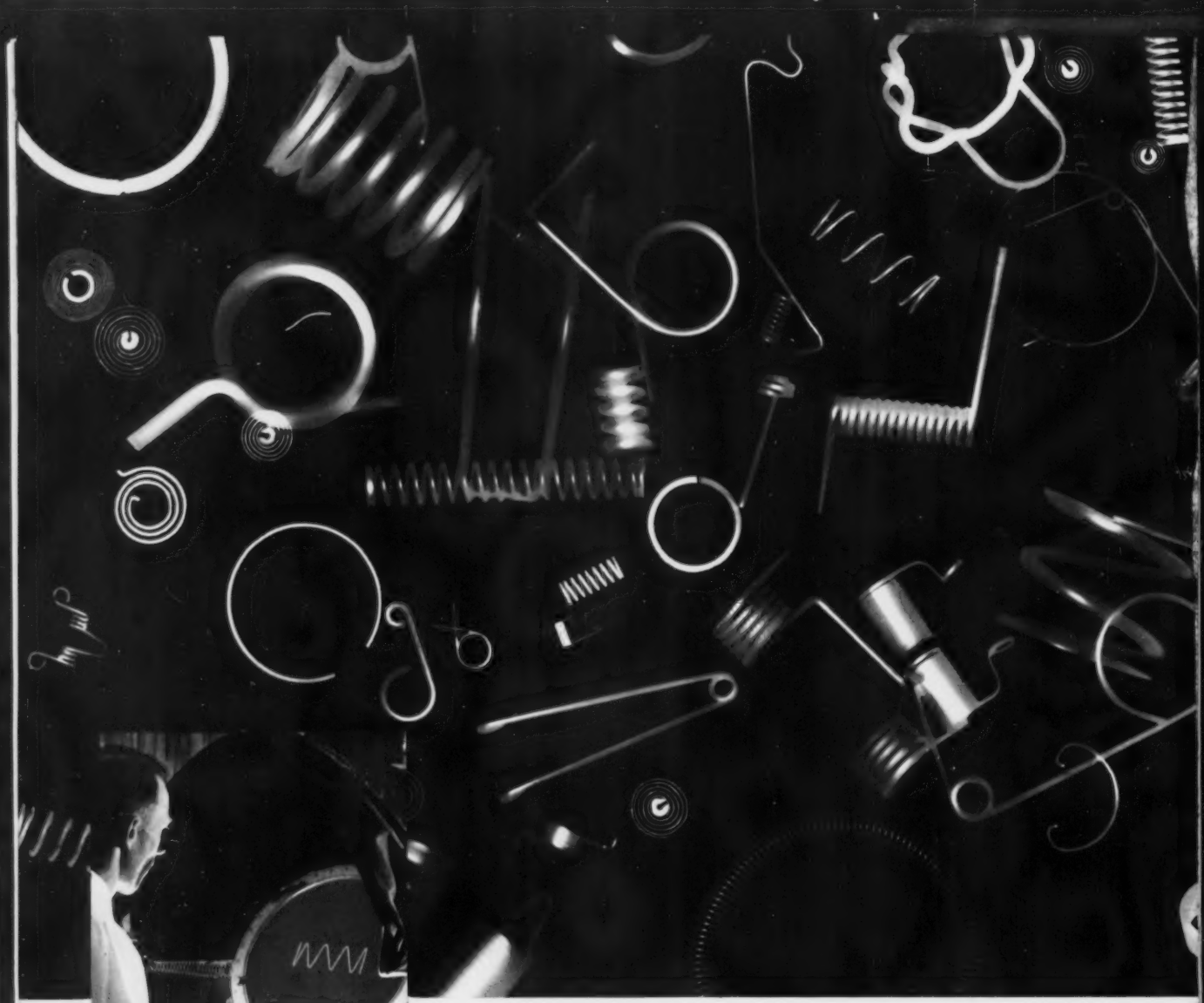

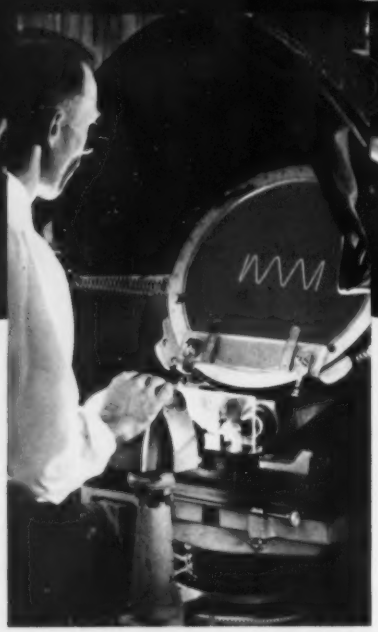

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New Aetna ideas contribute to an even better finished product. Space saving in the installation results in lower first cost. There is less equipment to buy and to install.

Aetna-Standard has installed more Continuous Galvanizing Lines than all other manufacturers combined.

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This new GRAY TELEVERSAL head tremendously increases machining range. Conveniently applied, quickly positioned, its great rigidity permits highest horsepower milling cuts.

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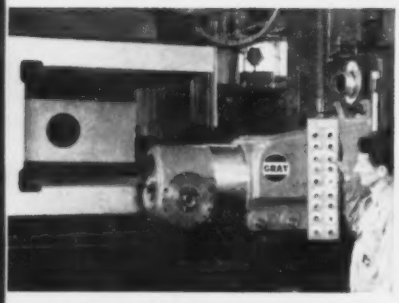
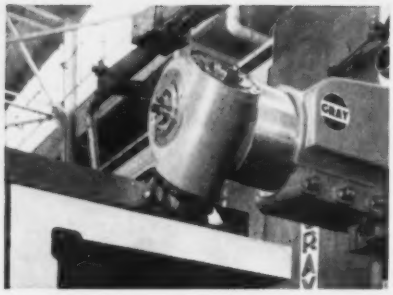
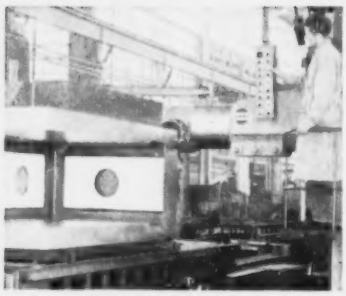
Not just an attachment, but a high power massively built, heavy milling unit that offers a new concept in versatility.

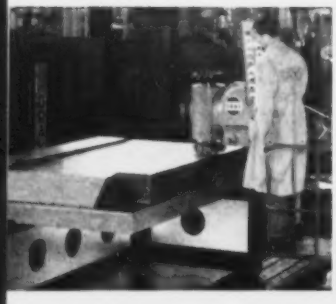
The G. A. GRAY Co., Cincinnati, Ohio

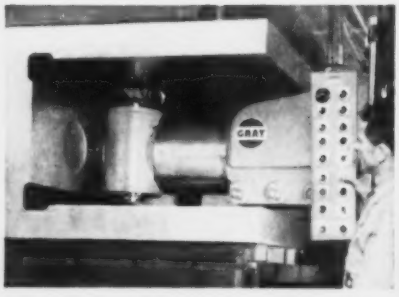


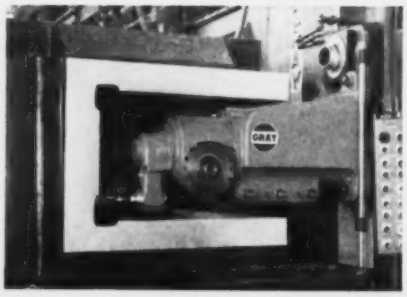




six different surfaces and more ... and only ONE work-setting







OTHER FINISHING EQUIPMENT • CONTINUOUS BUTT WELD PIPE MILLS • SEAMLESS TUBE MILLS • DRAWBENCHES AND
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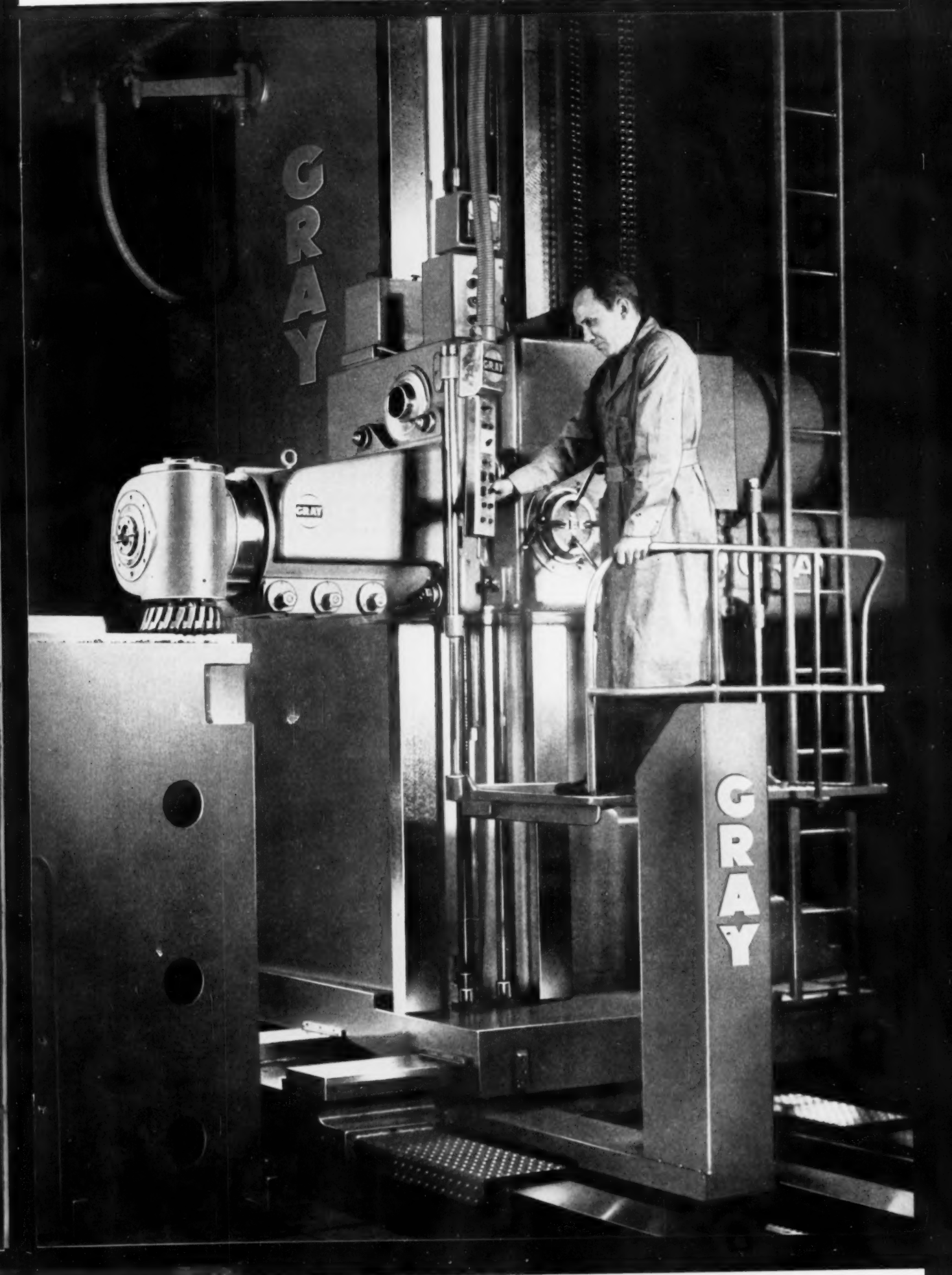

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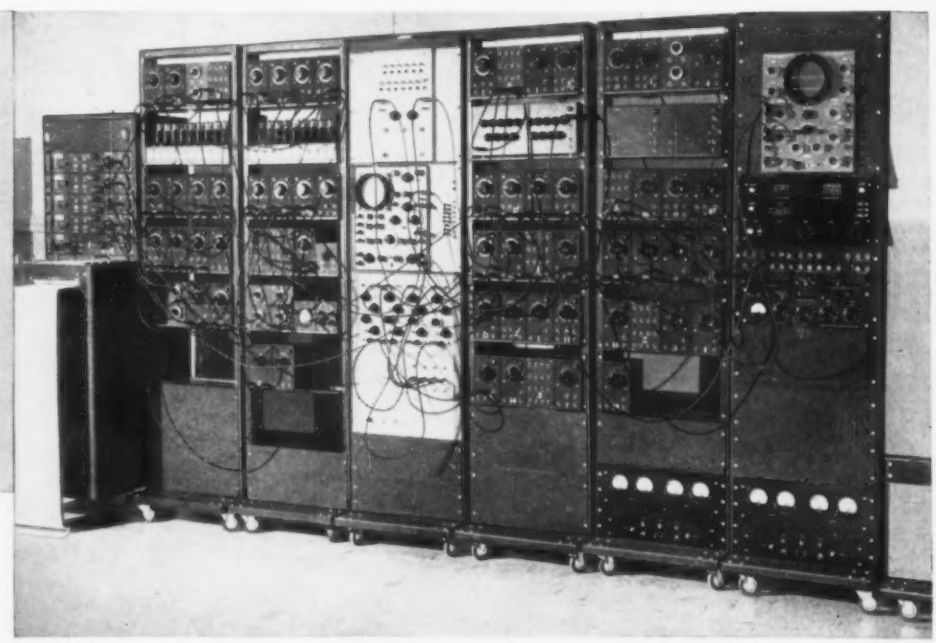
EFFECTIVE regulation is more than a matter of good regulator design. It embraces overall *system* design... the integration of interdependent components — generators, exciters, motors, regulators and other control equipment. As manufacturers of a most diversified line of electrical generation, distribution and utilization equipment, Allis-Chalmers, of course, is in a unique position to provide this practical approach to mill regulation.

Allis-Chalmers maintains separate departments, staffed by research, design, manufacturing and application specialists for each product. "Coordineering" results from an interdepartment exchange of ideas and technical information correlated in *one* department specializing in metal producing industry application. In this department, components are matched to meet the requirements of your job. Responsibility for *system* performance rests with one company.

Analytical Facilities Utilized...

System performance is simulated in the computers to get optimum configuration of components. Time constants and exciter ceilings necessary for desired response are established.



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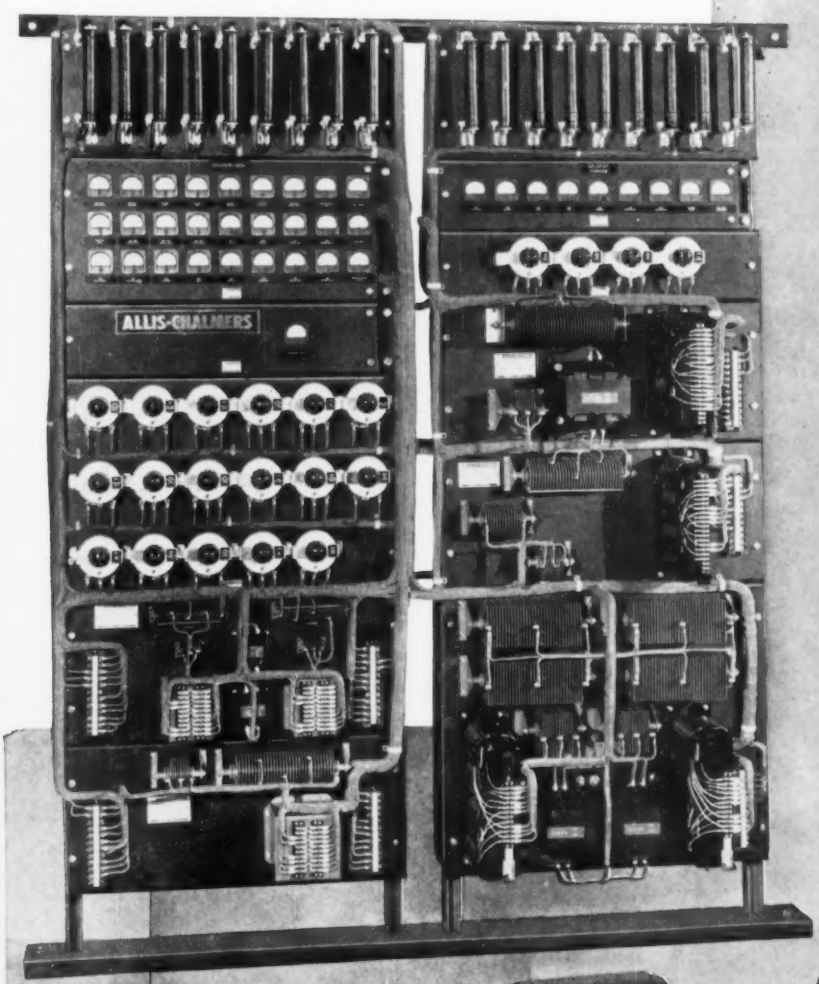
ALLIS-CHALMERS
Regulators



For MILL CONTROL

Three Types Available

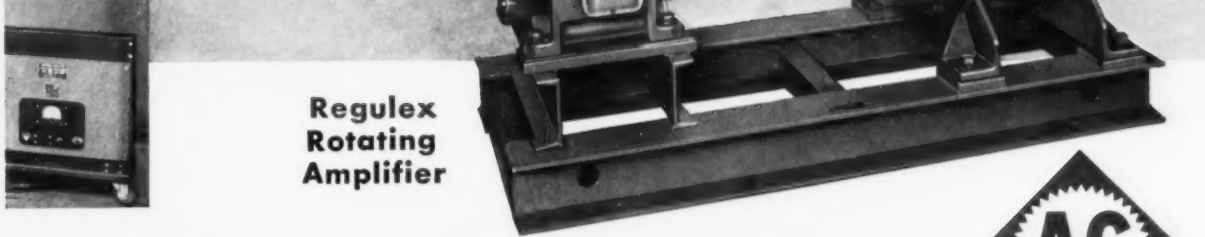
1 ***REGULEX* Rotating Amplifier** — Applicable where high power levels for reversible output are desired.

2 **Magnetic Amplifiers** — Applicable where low power levels for reversing or high power levels for non-reversing are desired.

3 **Combinations of Rotating and Magnetic Amplifiers** — Each complements the other for maximum regulating efficiency.

Get all the facts. See your Allis-Chalmers representative or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

Magnetic Amplifiers



Regulex Rotating Amplifier

CHALMERS

A-C ALLIS-CHALMERS

A-5030

THE ONE BEST WAY TO SELECT HEAT TREATING EQUIPMENT

Talk it over with the most experienced furnace experts you can find

That is exactly what we can offer you at Lindberg. A design and engineering staff concerned only with the development of equipment for applying heat to industry. This staff produces the most complete line of such equipment in the industry—heat treating furnaces, melting furnaces, ceramic kilns, high frequency induction units; big ones, small ones, electric or fuel-fired, built in our own plant or field-erected.

Whatever your requirements Lindberg's staff will study them without prejudice recommending the correct equipment to fill them whether you need only a simple heat treating furnace or a specially designed and developed installation to answer an exceptional problem in a newly-efficient way. You can be sure you have the right answer when you leave it to Lindberg. Get in touch with your nearest Lindberg Field Representative. (See your classified telephone directory or write us direct.)

This Lindberg Carbonitriding and Carburizing Furnace (electric or fuel-fired) is one of the most widely-used heat treating units in the world.

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ENGINEERING COMPANY

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Los Angeles Plant: 11937 S. Regentview Ave., at Downey, Calif.

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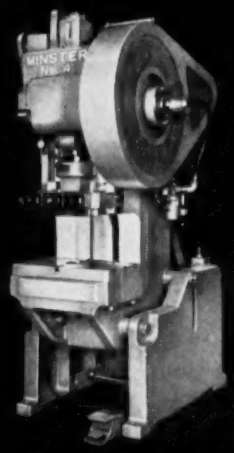
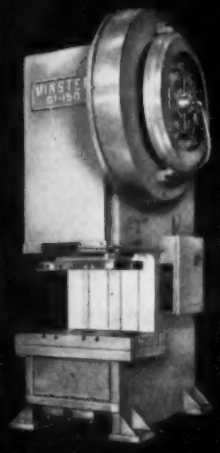
MINSTER PRESSES

mean less die repair, less scrap, less down time

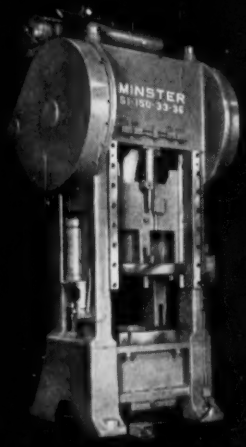


Open Back Inclinable Presses
12 tons through 200 tons

Straight Side Two Point Presses
50 tons through 500 tons



Fixed Base Single Point Presses
32 tons through 200 tons



Straight Side Single Point Presses
50 tons through 600 tons

Piece-Maker Automatic Presses
20 tons through 200 tons

Knuckle Joint Embossing Presses
150 tons through 1500 tons

Minster Press Lines not shown above:
Two Point Gap Presses inclinable or Fixed Base, 22 tons through 75 tons
Horning Presses, 12 tons through 95 tons.

THE MINSTER MACHINE COMPANY

Minster, Ohio

MINSTER®

now

Once again, Carpenter Metallurgists prove their desire and ability to pace the field in developments you want and need!

℗ *U.S. Patent Office*

Like all Carpenter Matched Tool and Die Steels every bar of STENTOR (Oil-Hard) is colored full length in its own distinctive color for quick, positive identification! Immediate availability from your local Carpenter Mill-Branch Warehouse, Office or Distributor.

...*Carpenter* extends the built-in safety factor of STENTOR (oil-hard) tool and die steel!

Remarkable heat treating versatility . . .
safe, dependable hardening through a broad range of 1425°F to 1525°F

The many advantages which make STENTOR one of industry's most used and talked-about steels are affected in no way by this exclusive new development. Its simplified analysis remains unchanged. It is still the easiest and one of the safest oil-hardening steels to harden. Requires no preheating whatsoever. Hardens from a lower temperature. Assures you less size change and distortion . . . uniform hardenability . . . full freedom from decarburization . . . long, dependable service.

And NOW . . . an extended Built-In Safety Factor enables you to heat treat STENTOR tools, dies and parts either of two ways: (1) At temperatures as low as 1425°F for the cost savings this brings you . . . or (2) Place them right in the furnace with other tools that are heat treated at temperatures up to 1525°F, and eliminate special furnace runs.

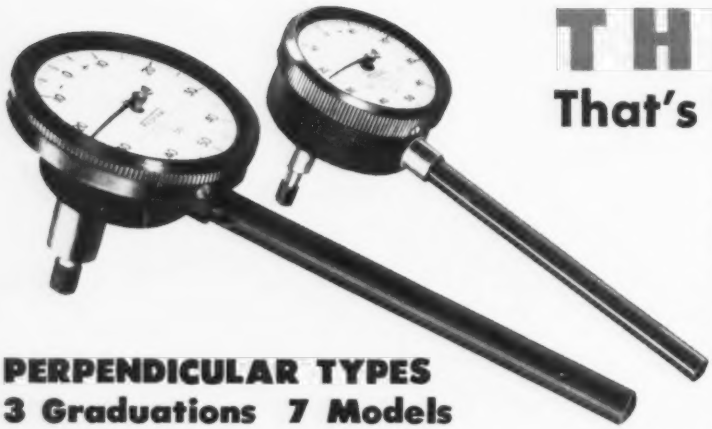
If you are not already using Carpenter STENTOR, it's time to re-evaluate the extra advantages you get with this versatile die steel.

JUST PRINTED! For more facts on how you and your men can Step Ahead with STENTOR, drop us a line on your Company letterhead for this new descriptive folder.

Carpenter STEEL

Matched Tool and Die Steels

The Carpenter Steel Company, 121 W. Bern St., Reading, Pa.
Export Dept.: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"



THE MOST
That's Why More People

PERPENDICULAR TYPES
3 Graduations 7 Models

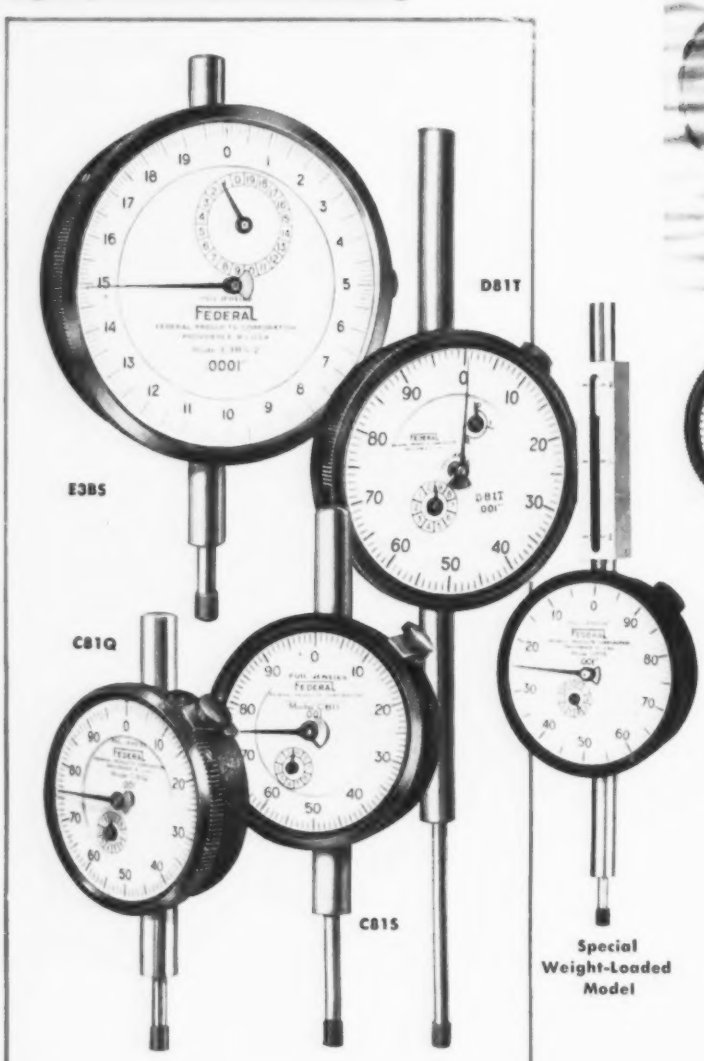
You get the greatest of all selections from which you can pick the right instrument for your job.

You get the benefits of doing business with a company which consistently offers improvements and new ideas.

You get a known accuracy and dependability built up over years of development and experience.

You save the confusion of stocking and maintaining several different makes of instruments.

LONG RANGE MODELS



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Completely Sealed

Completely protected from coolant, oil, oil fog, and water. Also protected from dust. Cushioned movement. Extra heavy case for rough usage. Extra strong mounting. Selection of 4 graduations, 6 ranges. A Federal "new".

SHOCKPROOF
Indicators

Proven winners in competitive endurance tests. Shock is absorbed and prevented from reaching sensitive and precisely aligned parts. No additional friction. No sacrifice in accuracy.

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Yours for the asking
Write

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Standardize on—

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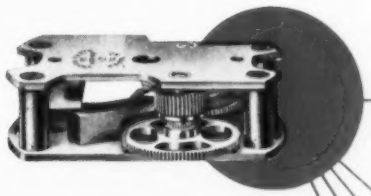
DIAL INDICATORS



UNIT MOVEMENT

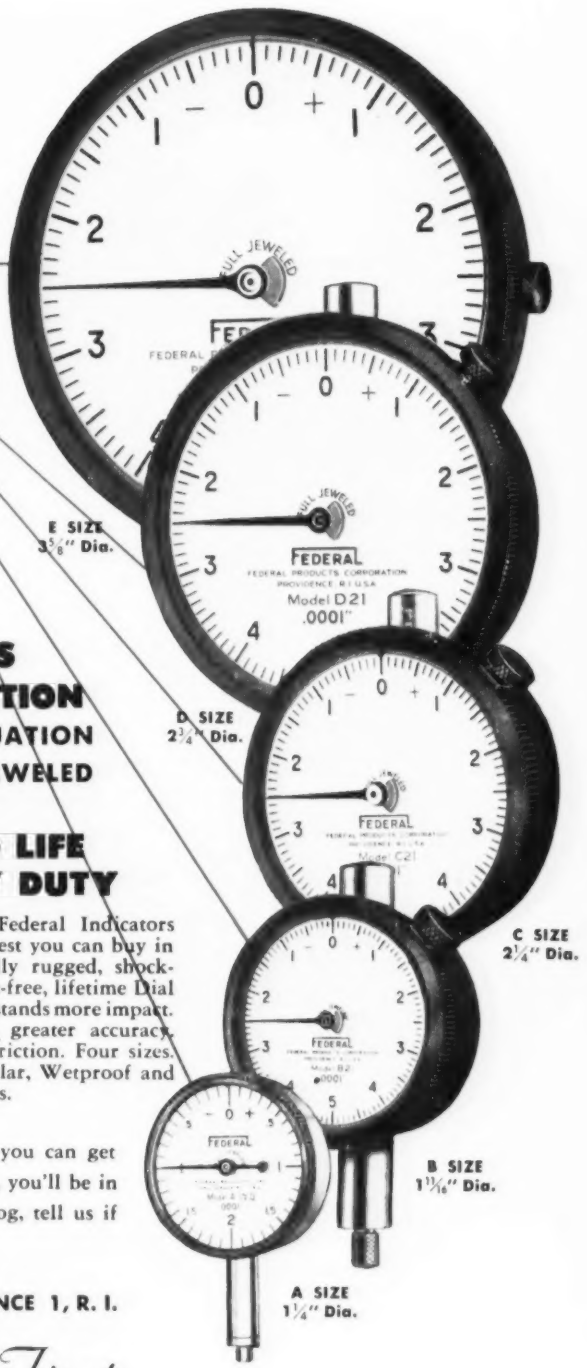
Assures Perfect Alignment
Positive Adjustment — Rigidity —
High Accuracy . . .

Maintenance men tell us repeatedly it is the easiest to repair.

FIVE SIZES
LOW FRICTION
ANY GRADUATION
PLAIN OR JEWELED

LONG LIFE
HEAVY DUTY

Another new in Federal Indicators (H Model). The best you can buy in every way. A really rugged, shockproof, maintenance-free, lifetime Dial Indicator that withstands more impact. Low maintenance, greater accuracy. 16% to 25% less friction. Four sizes. Furnished in Regular, Wetproof and Long Range models.



Whatever you need in Dial Indicators and Accessories you can get from Federal (direct from our Branch Offices too.) And, you'll be in line for new developments later. If you haven't a catalog, tell us if you want one.

FEDERAL PRODUCTS CORPORATION
7132 EDDY STREET **PROVIDENCE 1, R. I.**

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FOR RECOMMENDATIONS IN MODERN GAGES . . .
Dial Indicating, Air, Electric, or Electronic—for Inspecting, Measuring, Sorting, or Automation Gaging

Is steam treating an "unknown-quantity" to you?

If you work with metal . . . ferrous or non-ferrous . . . and haven't considered steam atmosphere heat treating for your product, you may find you've overlooked an unsuspected source of surprisingly substantial savings.

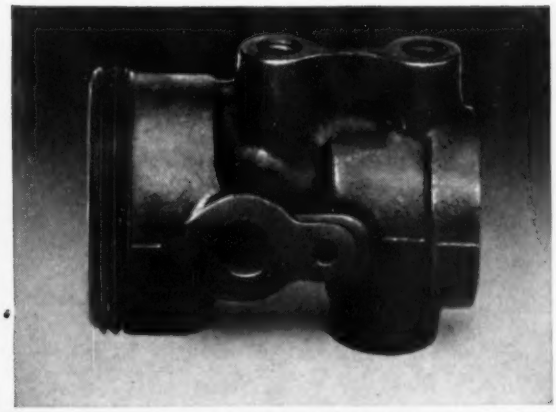
For in scores of plants it's becoming an outstanding cost-cutter on parts made of high speed steel, powdered iron, carbon steel, grey iron, brass aluminum and beryllium copper. And its advantages are almost as numerous as the materials being steam treated.

On high speed cutting tools, for instance, it keeps tools sharp longer. On powdered iron, compressive strength and hardness increase appreciably. On carbon steel it gives a uniform, attractive, blue-black finish. On grey iron it seals against porosity and gives a high degree of corrosion resistance. On non-ferrous parts it produces scale-free work ready for bright dip or often for use "as-is."

Here and on the opposite page are just four examples to illustrate our point. If you want others . . . or details on any of these . . . or want us to help investigate possible savings you can make, just phone your nearest L&N office or write us at 4956 Stenton Ave., Phila. 44, Pa. Catalog TD2-620(1) tells all about it, too; we'll be glad to send you a copy.

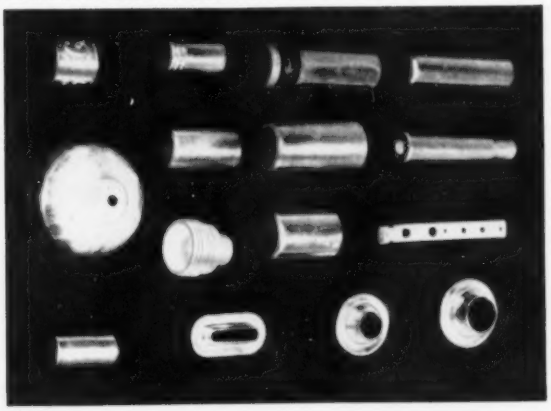
LEEDS NORTHRUP
instruments *automatic controls • furnaces*

If you would like to investigate the effect of steam treating, we will be glad to steam treat sample parts from your own plant for you.



Replaces Cadmium Plating . . . These grey cast iron valve bodies are used in the pneumatically operated sanders that deliver sand for improved traction under the wheels of trains, trolleys and trucks. Their manufacturer had a double-barreled problem . . . porosity in the castings was causing excessive rejects . . . expensive cadmium plating was necessary to prevent corrosion in service.

Steam treating has solved both problems in one operation. Rejects due to porosity have been eliminated, and many valves previously rejected have been salvaged. Cadmium plating has been eliminated entirely because exhaustive salt spray tests showed the steam-treated finish had a higher resistance to corrosion.

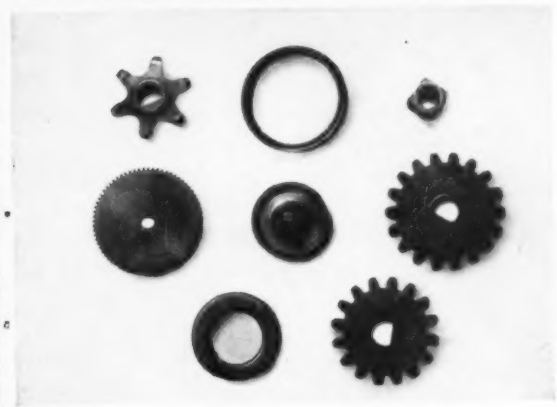


Cuts Expensive Pickling Costs . . . Non-ferrous lipstick tubes and other cosmetic containers made by a large Canadian manufacturer must be annealed before finishing operations can be performed. Scale was a problem. If left on, it ruined tools and dies . . . removing it meant expensive, messy pickling.

The solution was found when sample parts were annealed by the steam Homo® method. When this method was adopted as an integral part of the production line, pickling was eliminated. Subsequent figures from the cost-accounting department showed that eliminating this operation reduced annealing cost by 53 percent.

Puts "Extra-Life" in Cutting Tools . . . A machinery manufacturer faced a tough problem when specifications called for milling a 0.250 inch wide key-way slot into a piece of 4140 cold-rolled bar stock which was heat treated to a hardness of Rc 34 to 38. In addition, tolerances were tight . . . ±0.001 inch . . . with sides perfectly square.

The first high-speed steel tools used produced only four cuts and could not be resharpened because of the close tolerance. Hard-chroming the same tools improved cutter life to about 11 pieces per tool. Carbide tools held up for from 11 to 14 pieces. The next move was steam treating experimental batches of tools in an L&N furnace. The first batch averaged 100 parts per cutter, a second batch, 60 to 70 and a third lot, 100 to 125.



Raises "psi" of Powdered Iron Parts . . . Although many parts made of powdered iron function satisfactorily in the as-sintered condition, there are others where an increase in hardness and compressive strength is an advantage.

This is particularly true of such parts as the steam-treated gears, cams, etc., shown at left, where additional strength is needed on critical bearing surfaces. The shock-absorber piston in the center, for instance, presented a real problem . . . how to meet psi specifications for the thin-section flange around the outer edge. Steam treating proved a cheap, practical solution. Tests showed compressive strength of the flange increased from 1200 to 1400 psi. In addition, the parts, when oil dipped, had a pleasing uniform, blue-black color and high corrosion resistance.

wires that fish

In addition to wire for the traditional bent pins, CF&I-Wickwire makes a wire that's a real pro at fish catching. It's the special spring steel wire used to make fish hooks. Heat treated so it's soft and ductile, this high carbon steel wire can be severely deformed by fish hook makers, then heat treated again to give the finished hook a spring-like quality and hardness.

Chances are you don't need wire to make either pins or fish hooks. But *you may need one or more of the nearly 100 different categories of specialty wire for which CF&I-Wickwire is famous.* Let us show you how we can meet your most rigid chemical and physical specifications on high and low carbon wire in all sizes, shapes, tempers, finishes and grades.

Check This List!

FOR THE WIRE YOU REQUIRE, SEE CF&I-WICKWIRE.

FLAT AND SHAPED WIRES
Armor Wire
Bobby Pin Wire
Bookbinder Wire
Brush Wire
Casing Wire
Cotter Pin Wire
Curtain Spring Wire
Die Spring Wire
Gutter Broom Wire
Lock Spring Steel
Rake Tine Steel
Regulator Spring Wire
Snake Fishing Steel
Stapling Wire for Preformed Staples (Flat)

LOW CARBON FINE AND SPECIALTY WIRE
Bee Wire
Bonnet Wire
Bookbinder Wire
Broom Wire
Clip Wire
Dent Spacer Wire
Drapery Pin Wire
Florist Wire
Fuse Wire
Glass Netting Wire
Hairpin Wire
Hook and Eye Wire
Mattress Wire
Picture Cord Wire
Picker Tooth Wire
Pin Ticket Wire
Pin Wire
Ring Traveller Wire
Spiral Binding Wire
Stapling Wire
Stapling Wire for Preformed Staples
Stone Wire
Weaving Wire
Weaving Wire for Fly Screen Cloth
Wissco Iron Wire

HIGH CARBON FINE AND SPECIALTY WIRE
Aircraft Cord Wire
Armor Wire
Belt Hook Wire
Bobbin Ring Wire
Brush Wire (Tempered and Untempered)
Brush Wire (High Strain)
Chrome Vanadium Spring Wire
Core Wire (Aluminum Cable Steel Reinforced)
Curtain Spring Wire
Flexible Shaft Wire
"Gamma" Spring Wire (Upholstery Spring Wire)
Zig Zag Wire
No-Sag Wire
Hat Wire
Heddle Wire
Hose Reinforcement Wire
Hose Wire, Mechanical
Hose Wire, Vacuum and Defroster
Rope Wire
Signal Corps Wire
Spoke Wire
Hard Drawn Spring Wire
Oil Tempered Wire
Spheroidized or Annealed Spring Wire
Tire Bead Wire
Valve Spring Wire

MANUFACTURERS LOW CARBON COARSE WIRE
Bag Tie Wire
Basket Handle Wire
Box Binding Wire
Brush Handle Wire
"Cal-Tie" Wire
Can Key Wire
Case Hardened Ball Wire
Chain Wire
Clamp Wire
Clothes Pin Wire
Concrete Wall Reinforcement Wire
Garment Hanger Wire
Hay Baling Wire (Coiled)
Lingo Wire
Lintel Wire
Loop Wire
Merchant Quality Wire
Pail Bail Wire
Rivet Wire
Stapling Wire
Strand Wire
Tying Wire
Welding Wire
Wissco Iron Wire
Industrial Quality Wire
Cold Rolling Quality Wire
Heading, Forging or Roll Threading Quality Wire
Medium High Carbon Wire

CF&I-WICKWIRE WIRE

THE COLORADO FUEL AND IRON CORPORATION

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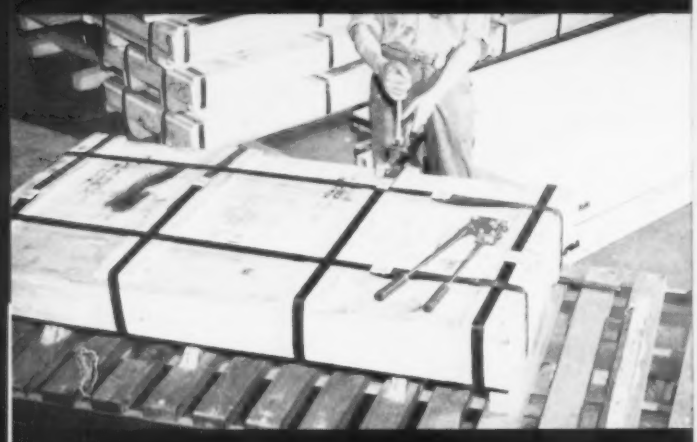
CANADIAN REPRESENTATIVES AT: Calgary • Edmonton • Vancouver • Winnipeg

4240

STEEL STRAPPING unitizes and braces aluminum ingots for carload shipping. *(Idea No. U1-4)*



STEEL STRAPPING reinforces packages of stainless steel sheets for export shipment. *(Idea No. U6-11)*

STEEL STRAPPING braces cast iron pipe for safe, secure movement by motor truck. *(Idea No. U5-1)*

AIM* for speed and savings

Product protection through Acme Idea packaging can bring you the important benefits of safe, secure packs with increased speed and labor-material economies. Throughout the entire scope of industry Acme Steel Ideas, procedures, tools and materials are speeding and protecting products from production line to end-user. You owe it to yourself to learn how.

A product protection-wise Acme Idea Man is located near your plant. He is immediately available to discuss your packaging problems and provide you with hundreds of in-use Acme Steel Strapping ideas for better packaging and shipping. The seven ideas shown on these pages are included in the Ideas-In-Action Report files your Acme Idea Man will be pleased to show you. Among the many Ideas-In-Action Reports Acme Steel has developed from the experiences of dozens of industries are sure to be applications that can be applied to your particular operations with important time and dollar benefits to you.

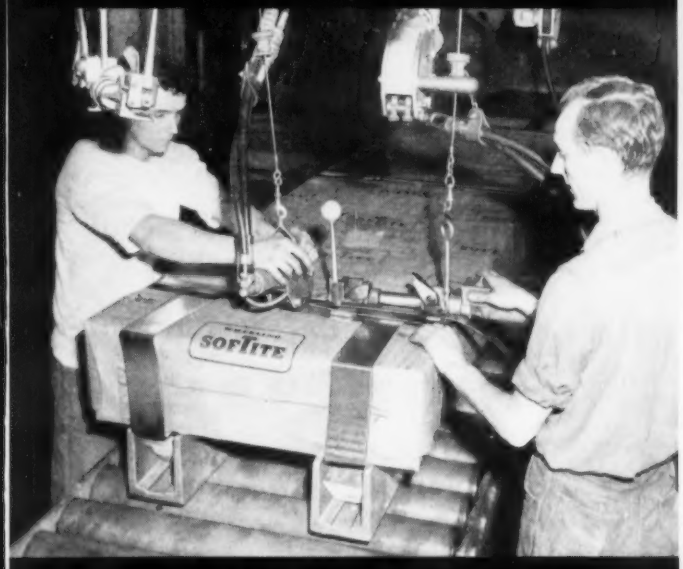
An Acme Idea Man is ready to offer you Ideas-In-Action, plus his training, experience and steel strapping know-how without cost or obligation in any form.

Your *Acme Idea Man can be contacted at the nearest Acme Steel office. Look under "Steel Strapping" in your classified directory, or send the coupon for full information.

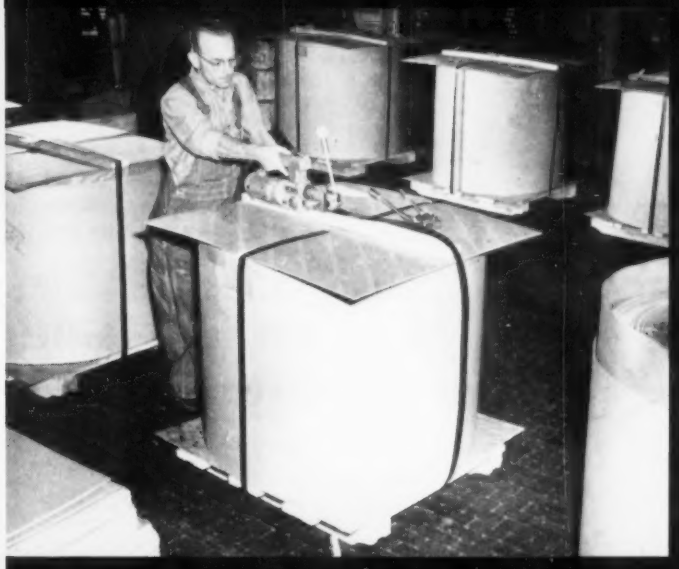
ACME STEEL **STEEL STRAPPING**

STEEL STRAPPING unitizes zinc slabs for fast, economical, mechanized handling. *(Idea No. U6-3)*

STEEL STRAPPING palletizes coils of tire bead wire for better handling and storage. *(Idea No. 54-4)*



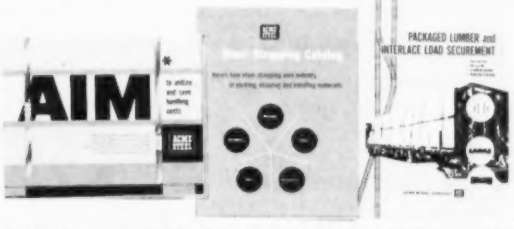
STEEL STRAPPING applied with hydraulic tools speeds sheet steel packaging. *(Idea No. U6-5)*



STEEL STRAPPING skid-loads coils of aluminum for safe, easier handling. *(Idea No. U6-10)*

3 IDEA BOOKS

These three information packed Acme Steel Idea Books are available to you on request. They will provide dozens of clues to better ways to package and protect your products and plant output.



Write today for your choice of the above three Acme Steel Idea Books. Merely indicate the books you want on the coupon at the right and mail. Your request will be filled promptly, with no obligation.

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Please send me the new Acme Steel Idea Books I have checked below:

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- ☐ **Have an Acme Idea Man call.**

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Title_____

Company_____

Address_____

City_____ Zone____ State_____

Engineers from Blaw-Knox and Arthur D. Little, Inc., make intermediate check on data as operator (on left) watches signals on control console of electronic computor

Power Piping Division develops

new "6 x 6" Flexibility Matrix Method —cuts calculation time from months to a day

Present day operating requirements demand power piping systems that can handle extremely high temperatures and pressures—often up to 4500 psi and 1100° F. Under these critical conditions pipe may expand as much as ten inches in a hundred feet of pipe.

To be sure of adequate flexibility of the piping system, the terrific stresses set up by this expansion must be accurately computed before fabrication. And these computations are often so complex that skilled stress analysts have had to take two to three months, sometimes more, to complete them.

Now, by using the Blaw-Knox "6 x 6" Flexibility Matrix Method, computation time is cut to one day.

Developed in an 18-month joint research project of the Blaw-Knox Power Piping Division and the Arthur D. Little, Incorporated, Cambridge, Mass., research consultants, this new method of computation takes advantage of the high speed and accuracy of electronic computers.

Results are: Completely automatic computation with no limitations on the complexity of the systems. Full accuracy—as any inconsistencies in the input data are detected by the machine and all results are carried to six significant figures. Tremendous saving in time. Highly profitable saving in costs.

Originally developed for calculating stress analysis on systems fabricated or designed by Blaw-Knox Power Piping Division, this new method of computation is now available to consulting engineers, companies and individuals responsible for the design of power piping systems.

Bring your piping stress problems to our Power Piping Division for a discussion with our experienced piping engineers.

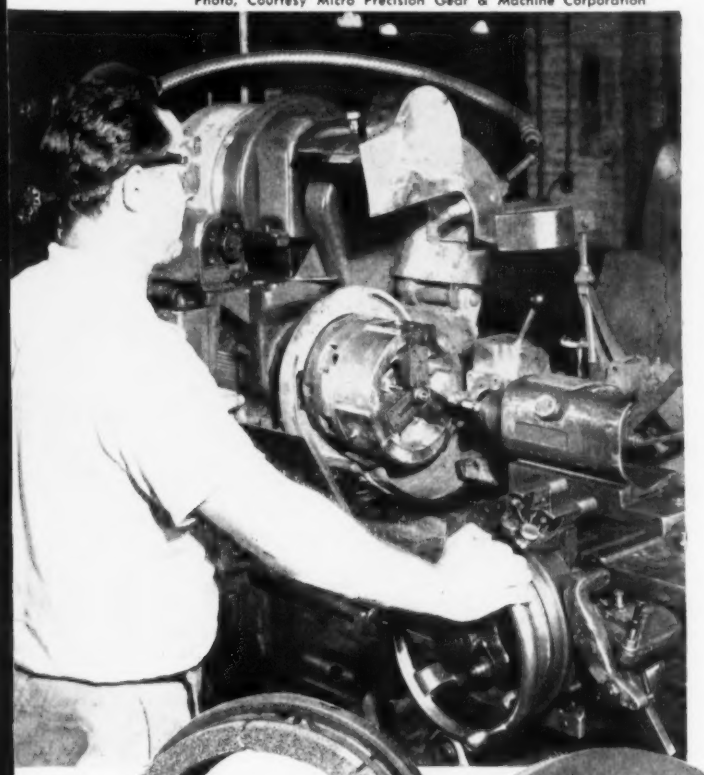
BLAW-KNOX

BLAW-KNOX COMPANY
Power Piping and Sprinkler Division
Pittsburgh 33, Pennsylvania

Complete facilities for prefabrication and erection of piping systems—complete line of functional spring hangers, assemblies and vibration eliminators—complete engineering and installation of Automatic Sprinkler Systems

Sterling's "sixth element" grinding wheels offer new standards of job-tailored quality

Photo, Courtesy Micro Precision Gear & Machine Corporation



SOMETHING NEW has been added to the standard grinding wheel elements—grain, size, grade, structure and bond. In making its specifications, Sterling considers a *sixth element*—the *human* element—to create an abrasive unit closely tailored to the demands of each individual job.

The sixth element concerns the operator, what he likes in a grinding wheel, what he expects it to accomplish, his work habits, his unusual preferences, and all the many other personal factors that come into being when he works at his machine.

It is this close attention to the *sixth element* that gets more production out of the wheel, sets new standards of economy, and reduces job-fatigue. Creating specifications that are slanted to the operator's likes and dislikes is a special ability that Sterling abrasive engineers will gladly apply to your grinding problem. Write us or your nearest Sterling distributor.

Sterling's small internal grinding wheels carry with them the same assurance of economical performance and quality as the largest "Wheel of Industry." Use them with confidence in superior results.

STERLING GRINDING WHEEL CO. TIFFIN, OHIO
USE SAFETY GUARD · SEE A.S.A. SAFETY CODE
STERLING GRINDING WHEEL CO.
USE SAFETY GUARD · SEE A.S.A. SAFETY CODE
STERLING GRINDING WHEEL CO.
TIFFIN, OHIO

"Wheels of Industry"—Vitrified and Resinoid—provide the most economical and efficient method of metal removal.

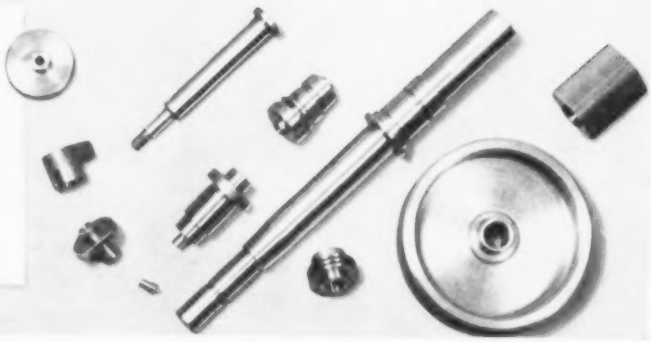
STERLING GRINDING WHEELS

THE WHEELS OF INDUSTRY
STERLING

STERLING GRINDING WHEEL CO., TIFFIN, OHIO—SUBSIDIARY OF ABRASIVE AND METAL PRODUCTS COMPANY

Republic
COLD FINISHED STEEL...

REPRESENTATIVE PRECISION PARTS made of Republic Cold Finished Steel are shown here. Parts like these have an enviable record of reliability—helping National Cash Registers to total more sales than any other machines, for more than a half century.



REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

PERFORMANCE PROVED

in National Cash Registers for over 50 years

The proof of the product is in its performance. That's why we take particular pride in supplying cold finished steel to The National Cash Register Company of Dayton, Ohio.

Republic Cold Finished Steel has been helping National Cash Registers ring up sales for more than a half century. Ever since the Union Drawn Steel Company, now our Union Drawn Steel Division, pioneered the cold drawing process, National Cash Register products have totaled enviable service records backed by the uniform excellence of Republic Union Drawn Carbon and Alloy Steel components.

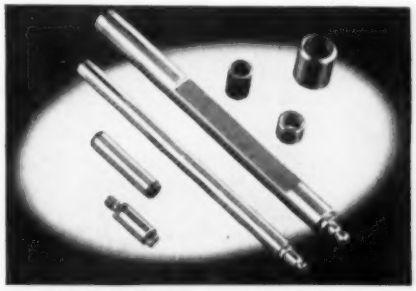
You, too, can capitalize on the many outstanding advantages of Republic Cold Finished Steel. For example, in comparison with hot rolled bars, you get maximum machinability. This feature alone makes possible higher speeds and feeds, finer finished surfaces and longer tool life.

In addition your parts will have higher ultimate strength, yield point and hardness when you use Republic Cold Finished Steel. Extreme accuracy in size and cross section plus an as-received bright, smooth finish enable you to eliminate all further finishing for many applications.

Join the growing list of users scoring production gains through the use of Republic Cold Finished Steel. Contact your Republic representative or your Republic Union Drawn Distributor. Or mail the coupon for full details.

HEAVY-DUTY PERFORMANCE plus minimum weight are provided by these gear train-components made of modern, flight-weight alloy steels. Republic, world's largest producer of alloy steels, can help you determine the precise analysis best suited to your application. Result: A superior product combining strength, toughness, and durability — plus production economy.

SUPERIOR CASTING PERFORMANCE is the basic reason why the manufacturer of this glass-mold insists on Chateaugay, Republic's exclusive premium pig iron. Requirements call for extremely smooth hand-finished surface with surrounding metal free of flaws or porosity. Dense, fine-grained Chateaugay castings meet every need. Rejects are less than 1%. Send coupon for further information.



CORROSION-RESISTANT PERFORMANCE in addition to machinability, strength, and toughness are four good reasons why the manufacturer of these carburetor parts has standardized on Republic Free-machining ENDURO® Stainless Steel Bars. ENDURO is available in a complete range of analyses in cold finished and hot rolled bars, special sections and wire. For complete information, mail coupon today.

STEEL

and Steel Products

REPUBLIC STEEL CORPORATION
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Please send me further information on:

☐ Cold Finished Steel ☐ Alloy Steels
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Name_____ Title_____

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The ONLY Turret Lathe with a fully automatic thread-chasing cycle!

Here is full turret lathe versatility and a threading attachment with a fully automatic cycle — all in one machine. Now you can be sure of concentricity of threading with other lathe work, *all done in one chucking*, with the time saving of the Auto-Threader! Nowhere else in the world can this be found on a turret lathe.

This Auto-Threader will chase straight or taper threads — or a combination — internal or external, from the front of the machine.

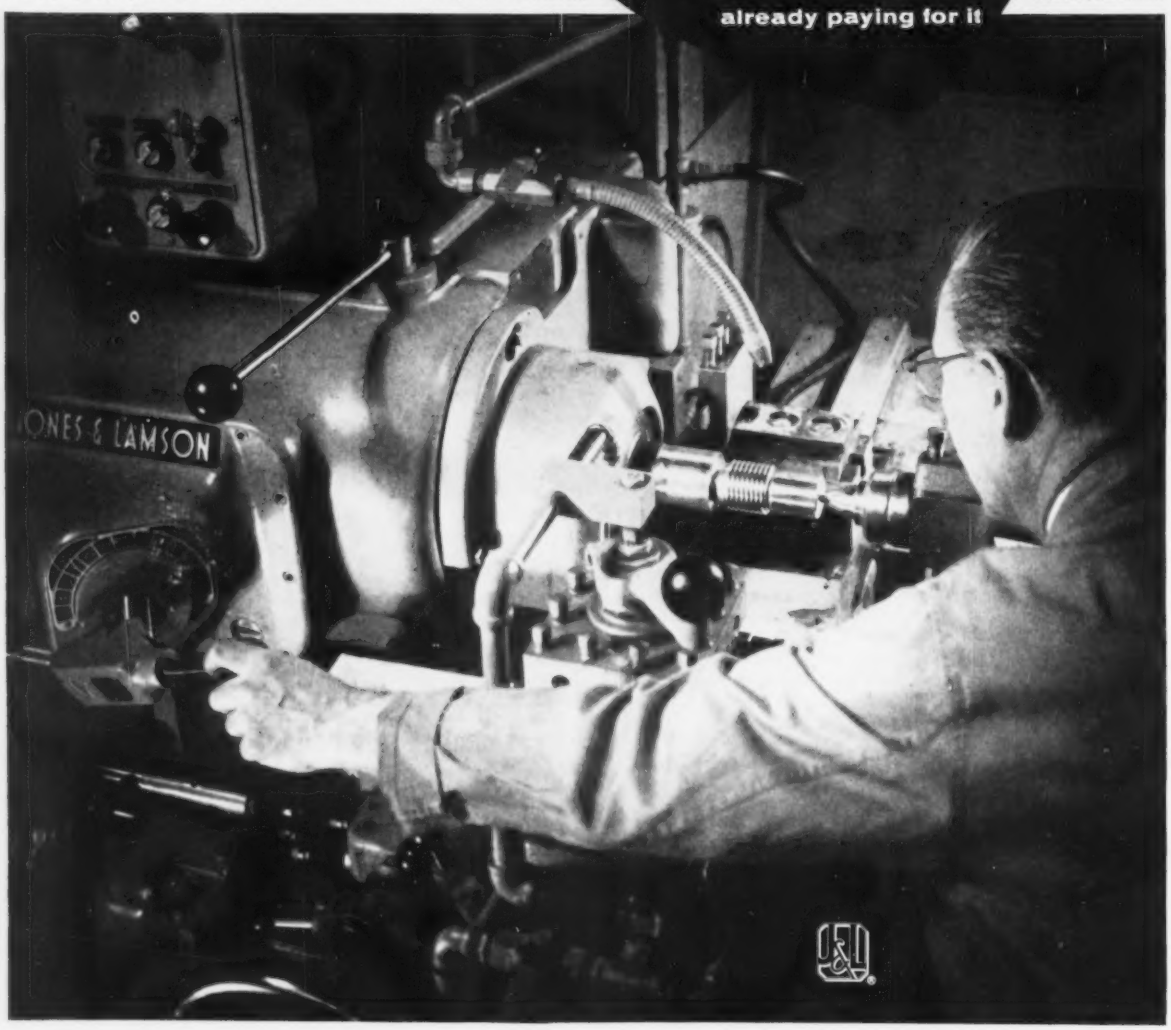
Concerning this J&L development, a customer writes: "We are tripling production on many of our items."

Write for descriptive folder No. 5440. JONES & LAMSON MACHINE COMPANY, 511 Clinton Street, Springfield, Vermont.

JONES & LAMSON
TURRET LATHES

the man who needs a new machine tool is already paying for it

Turret Lathes • Fay Automatic Lathes • Milling & Centering Machines • Optical Comparators • Thread Tools — Thread & Form Grinders



"With Weirkote® you can forget plating or dipping after fabrication. It just won't peel or flake!"

Q.—Weirkote—is that a new kind of steel?

A.—*"New" only to those who don't know of its advantages. It's a zinc-coated steel with a skin-tight surface, produced by a continuous galvanizing process instead of the old pot-dip method.*

Q.—Well, we've tried galvanized before for the parts and products we make. But it just couldn't stand up under the punishment of fabrication.

A.—*Must have been the old type galvanized. When you use Weirkote for fabrication, you'll find its surface stands up under the severest stresses. Punch it, lock it, crimp it, deep-draw it—its zinc coating stays intact. It's got a* built-in *resistance to peeling and flaking.*

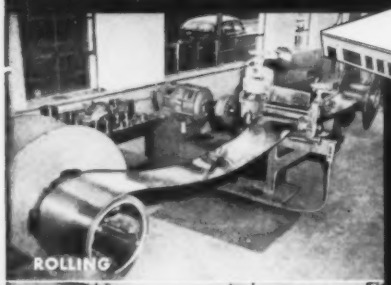
Q.—Well, say—that'd save all the cost of plating or dipping after fabrication, wouldn't it?

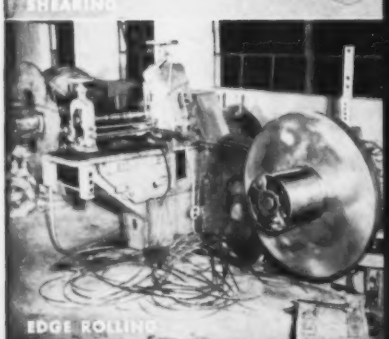
A.—*Exactly! Plus assuring you a* uniform *protective coating at all times—something even a special coating doesn't always provide on the more intricately fabricated parts.*

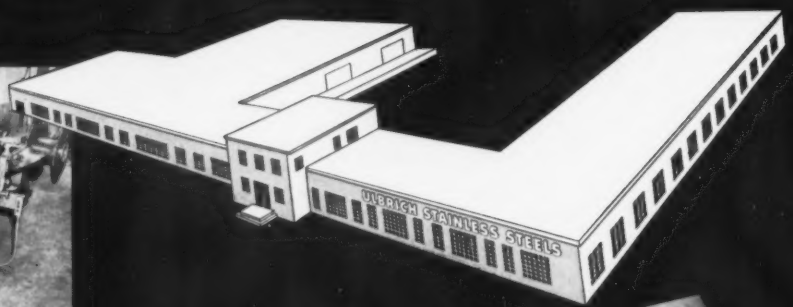
Send today for free booklet that details the time- and cost-saving advantages of using skin-tight zinc-coated Weirkote. Write Weirton Steel Company, Dept. A-1, Weirton, West Virginia.

WEIRTON STEEL COMPANY
WEIRTON, WEST VIRGINIA
a division of
NATIONAL STEEL CORPORATION

the biggest little mill in the country







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rolled, slit, sheared, flattened,
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Certified ANALYSIS can be given on any Ulbrich material.

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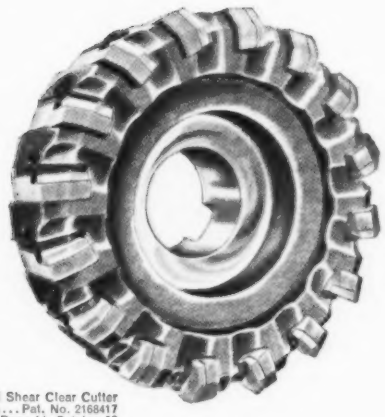


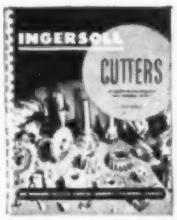
Ingersoll Shear Clear Cutter
27600 series... Pat. No. 2168417
Page 14, Catalog 66

Feed rate increased 2½ to 5 times at Vaughn with this INGERSOLL SHEAR CLEAR® CUTTER

The cutter previously used was nullifying the investment in a new standard, knee-type milling machine. The machine had more power than was being utilized. The feed rate was only 12" per minute. The change to Ingersoll Shear Clear permitted the Vaughn Machine Company, Cuyahoga Falls, Ohio, to capitalize on its machine investment and obtain the economy and efficiency of increased feed rate. A feed range of 30" to 60" per minute, when milling rough forgings and steel castings, is now continuously maintained.

Ingersoll inserted blade cutters are used on all makes of machines for milling and boring a wide range of materials. An Ingersoll Cutter Division representative will be glad to discuss this and other feed rate experiences with you.

Whether you are concerned with feed rates, longer tool life, finish or cutter costs, the new Ingersoll cutter catalog will be a valuable guide. Write Department 66 N.



Use this new 82 page guide for selecting the right inserted blade milling and boring cutters for your work. Write for catalog #66, today.

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THE INGERSOLL MILLING MACHINE COMPANY

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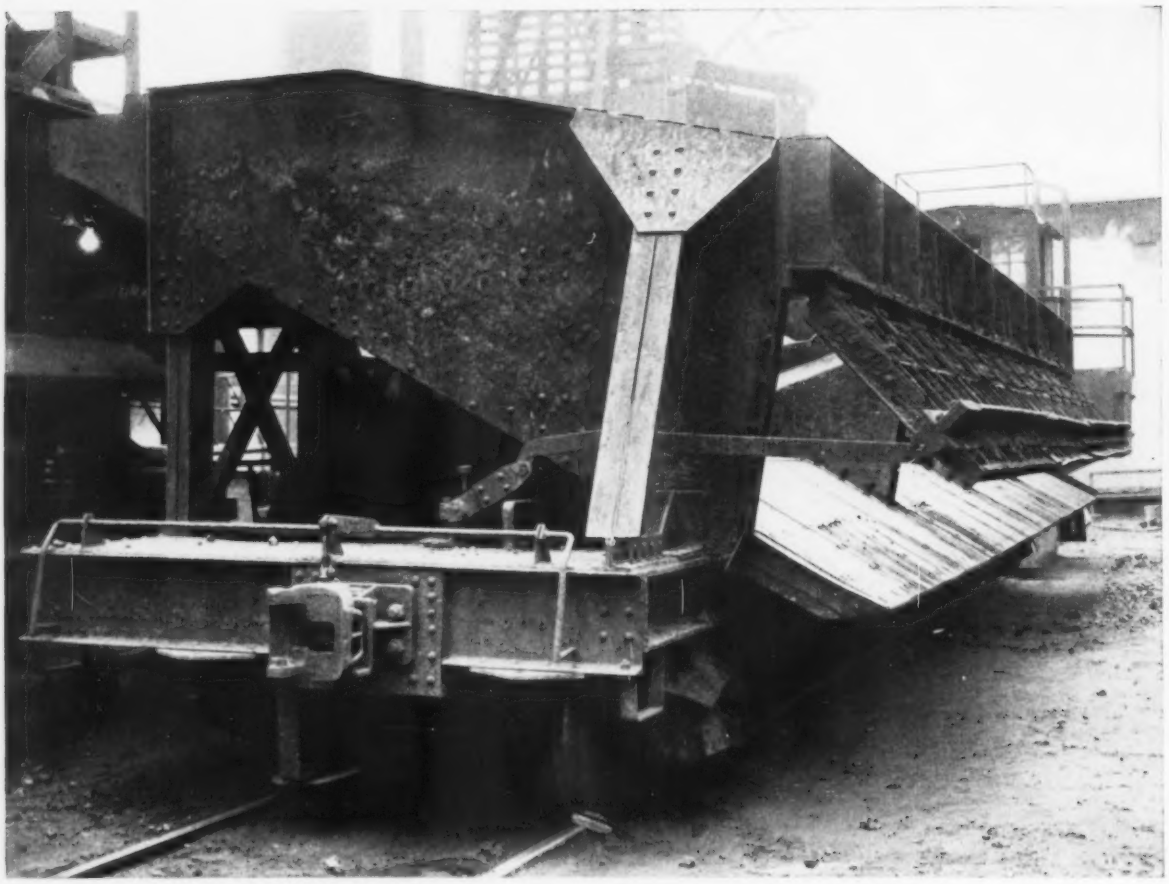


Coke quenching car, Youngstown Sheet and Tube Co., Youngstown, Ohio. Ductile iron plates, doors, diaphragms, and door hinge brackets have greatly extended the service life and reduced maintenance costs on cars of this type. The castings were held in place with rivets of "Yoloy", a nickel-copper steel produced by Youngstown.

Service life extended...

Hopper car survives coke quenching ordeal five times longer with Ductile Iron

This hopper car is on a sizzle cycle at the Brier Hill coke plant of Youngstown Sheet and Tube.

It totes 9 ton loads of 2000° F. coke from oven to cooling tower for water spray quenching. Round the clock. Seven days a week.

Despite these punishing abrasive and oxidizing conditions, ductile iron end and back plates, fastened with Yoloy steel rivets, were still serviceable after 18 months' service. *That's nearly five times the life of 1½" boiler steel plates previously used.* No warping. No cracking. Limited scaling.

A second comparative test – this time on the hopper doors – showed ductile iron lasted three times longer than gray iron. Result: Youngstown now standardizes on ductile iron for all parts that come in contact with hot coke.

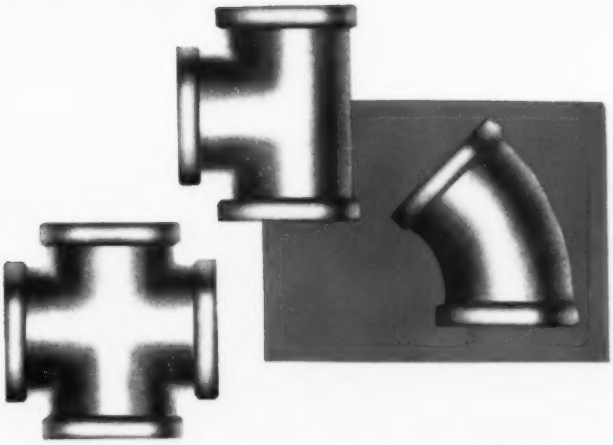
Maybe ductile iron is the answer to your hot application problem, too. At high temperatures, it offers excellent resistance to growth, warpage and oxidation. It's strong and tough. Combines many advantages of both steel and cast iron. Proven successful for furnace doors, grates, pouring troughs and the like.

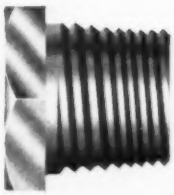
Want to know more about this new material? Write for "Ductile Iron. The Cast Iron THAT CAN BE BENT." Gives full particulars on Heat Resistant Ductile Iron and the entire Ductile Iron family.

DUCTILE IRON

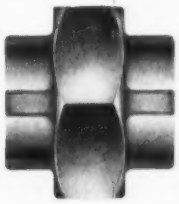
ductile iron . . . the cast iron that can be twisted and bent

The INTERNATIONAL NICKEL COMPANY, Inc.
67 Wall Street, New York 5, N. Y.

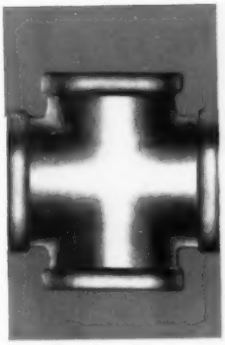




YOU CAN BEAT CORROSION



ESCO CAST STAINLESS FITTINGS SOLVE CORROSION PROBLEMS



Conveniently warehoused in *ESCO* Alloys 45 (Type 316), 40 (Type 304), 20 (ACI CN-7M) and Hastelloy B and C, *ESCO* 150 lb. PSI fittings and flanges are stocked in the standard range of types and sizes in screwed, flanged and welding styles. Special cast fittings are available, or can be made to engineering specifications in any size and in all analyses. Alloy designation is "in-the-metal" on all fittings.

See your nearest ESCO dealer—he can help you solve your corrosion problems. Ask for ESCO Catalog No. 175.

ESCO

ELECTRIC STEEL FOUNDRY COMPANY

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MFG. PLANTS AT PORTLAND, ORE. AND DANVILLE, ILL.
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For anything in special steel – *call Crucible.* Our nationwide chain of warehouses covers every industrial center in the country – makes the full range of Crucible specialty steels quickly available to you, wherever you are located.

Stocks maintained of:
Rex High Speed Steel...ALL grades of Tool Steel (including Die Casting Die and Plastic Mold Steel, Drill Rod, Tool Bits, and Hollow Tool Steel Bars) . . . Stainless Steel (Sheets, Bars, Wire, Billets, Electrodes) . . . Max-el, HY-Tuf, AISI Alloy . . . Onyx Spring, Hollow Drill Steel and other special purpose steels.

So for fast, *local* service on special steel orders – whether you want a pound or a ton – always call Crucible – *big enough to serve you . . . small enough to want to.*

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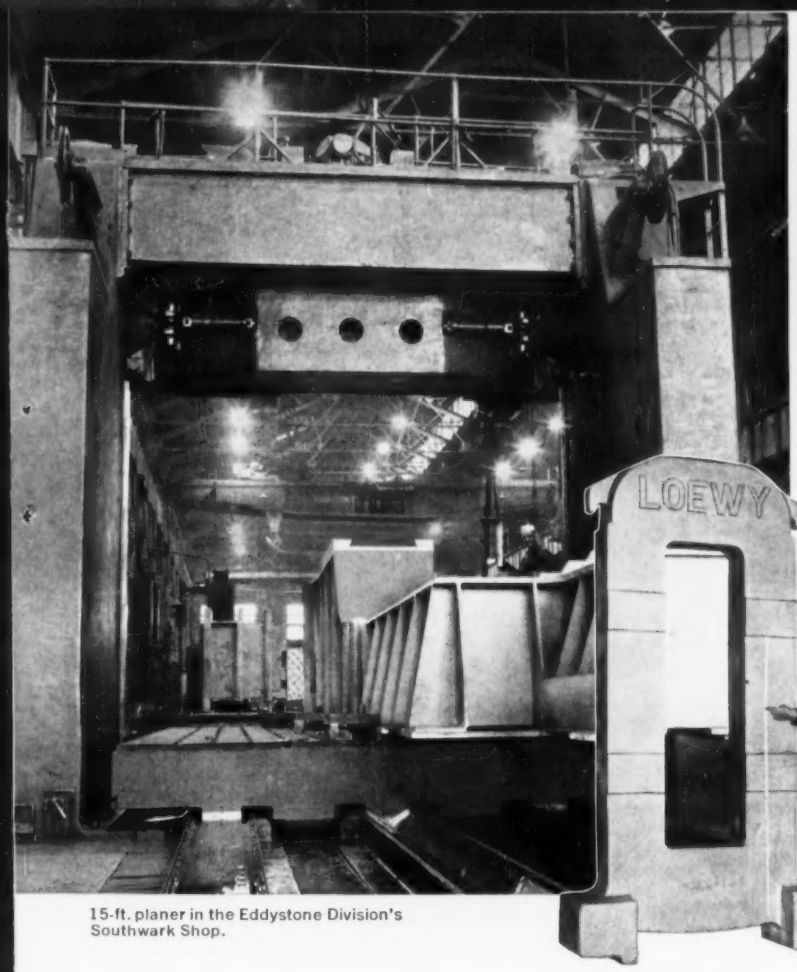
General Sales Offices, The Oliver Building, Mellon Square, Pittsburgh 22, Pa. Branch Offices and Warehouses: Atlanta • Baltimore • Boston • Buffalo • Charlotte Chicago • Cincinnati • Cleveland • Dallas • Dayton • Denver • Detroit • Harrison • Indianapolis • Los Angeles • Milwaukee • New Haven • New York Philadelphia • Pittsburgh • Portland, Ore. • Providence • Rockford • San Francisco • Seattle • Springfield, Mass. • St. Louis • St. Paul • Syracuse • Toronto, Ont.

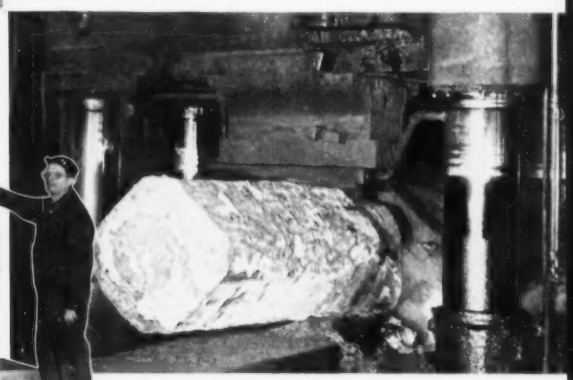


15-ft. planer in the Eddystone Division's Southwark Shop.

General Machine Shop at the Eddystone Division, Eddystone, Pa., whose 1,500,000 square feet of manufacturing space includes huge fabrication shops and a nonferrous castings foundry.

•

Blooming an ingot at the Standard Steel Works Division, Burnham, Pa., under one of the 2500-ton hydraulic presses.



Vast, integrated Baldwin-Lima-Hamilton facilities enable Loewy-Hydropress to deliver your rolling mills on time

When Loewy-Hydropress designs and builds your rolling mills, you aren't plagued by the usual troublesome and expensive delivery delay. For Loewy has at its disposal the vast, yet smoothly integrated resources of the entire Baldwin-Lima-Hamilton Corporation.

The two B-L-H divisions called upon most frequently to make parts for Loewy-designed rolling mills are the Standard Steel Works and Eddystone Divisions. The necessary steel components are cast or forged at Standard. And Eddystone, with its extensive machining facilities, supplies the completely finished nonferrous castings and weldments. Other members of the B-L-H family with excellent facilities for producing rolling mill parts are the Hamilton Division, Hamilton, Ohio; the Austin-Western Division, Aurora, Ill.; and the Madsen Division, La Mirada, Calif.

Close coordination among all Baldwin-Lima-Hamilton divisions is the chief reason why Loewy-Hydropress can deliver your rolling mills faster.

To your individual production requirements, we design, build and install hot and cold rolling mills for ferrous and nonferrous metals, continuous merchant and wire-rod mills, skelp mills, two-high and three-high blooming mills, high-speed foil mills, continuous billet and sheet-bar mills, strip, slabbing, plate, structural, rail mills, and special mills. Write us today, Dept. A-2, for illustrated bulletin L-164.

Loewy-Hydropress designers at the company's headquarters in New York City.

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111 FIFTH AVENUE, NEW YORK 3, N.Y. Rolling mills • Hydraulic machinery • Industrial engineering

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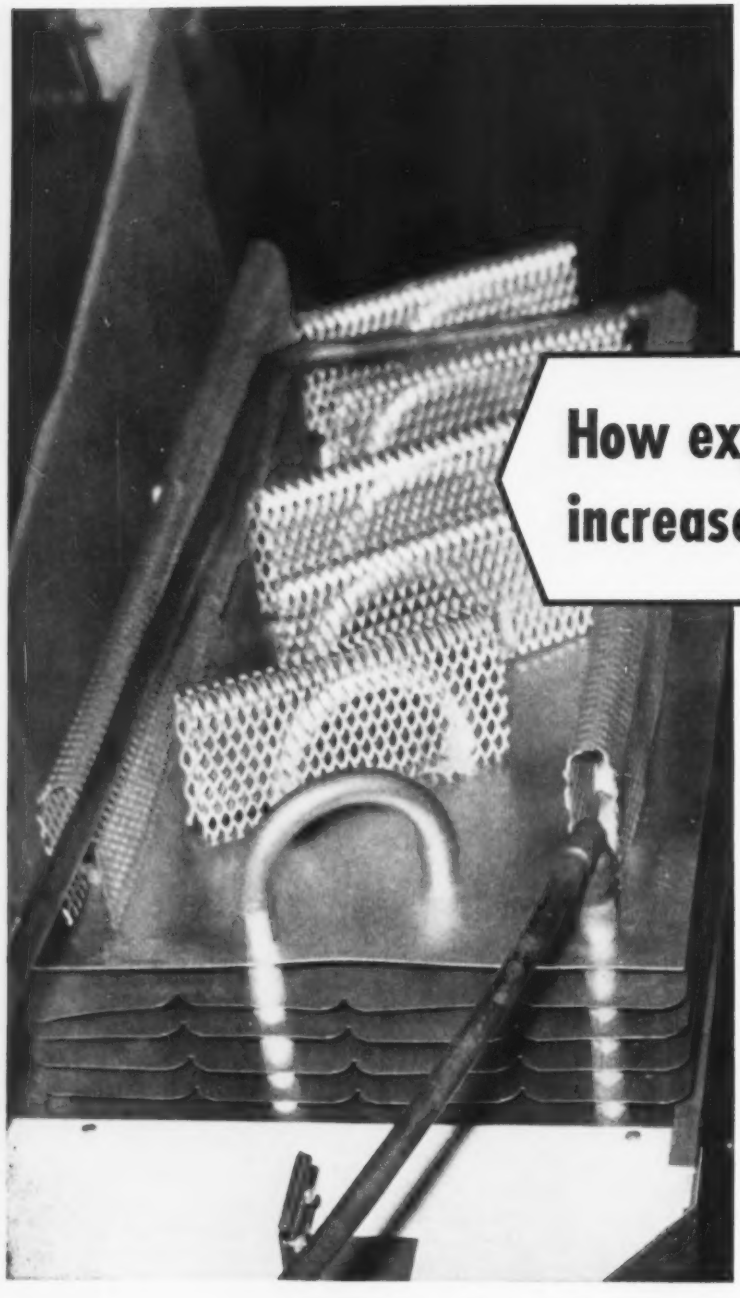

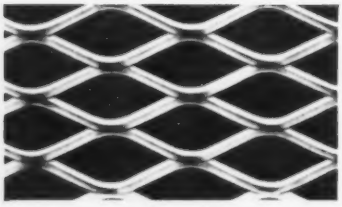

How expanded aluminum increased coil efficiency

Anheuser-Busch, Inc., St. Louis, Mo., used Penmetal expanded aluminum in their freezing units to cover the exposed ends of the evaporator coils. This expanded aluminum provided additional prime surface for frost collection on the cooling coils and fins—thus increasing the efficiency of the unit.

But Anheuser-Busch found other advantages in expanded aluminum. Cooling air circulates freely through the open mesh . . . it won't rust . . . can't ever loosen . . . and was easy to shape.

Does the success of this manufacturer open your eyes to a new possibility for solving some problem of your own by using expanded aluminum? Write today, for a reference copy of booklet 507 EM. No cost or obligation.

Penmetal expanded aluminum used to cover exposed ends of evaporator coils in Anheuser-Busch refrigerator-merchandiser.

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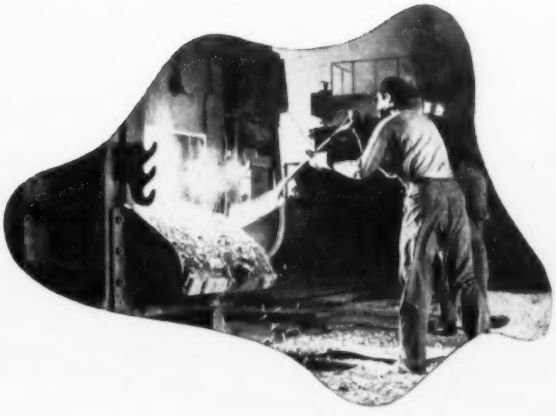
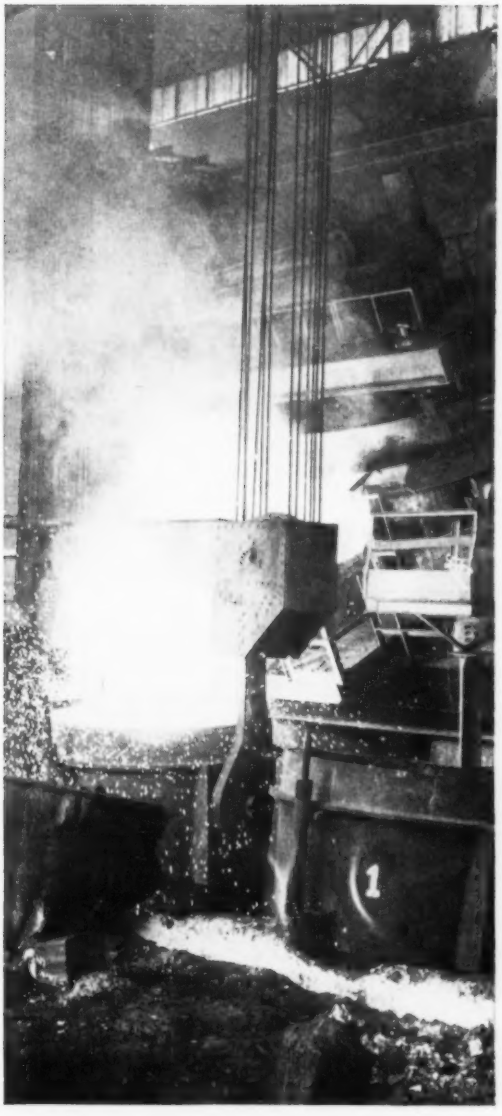
Penmetal 1869

PM-129





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Lectromelt

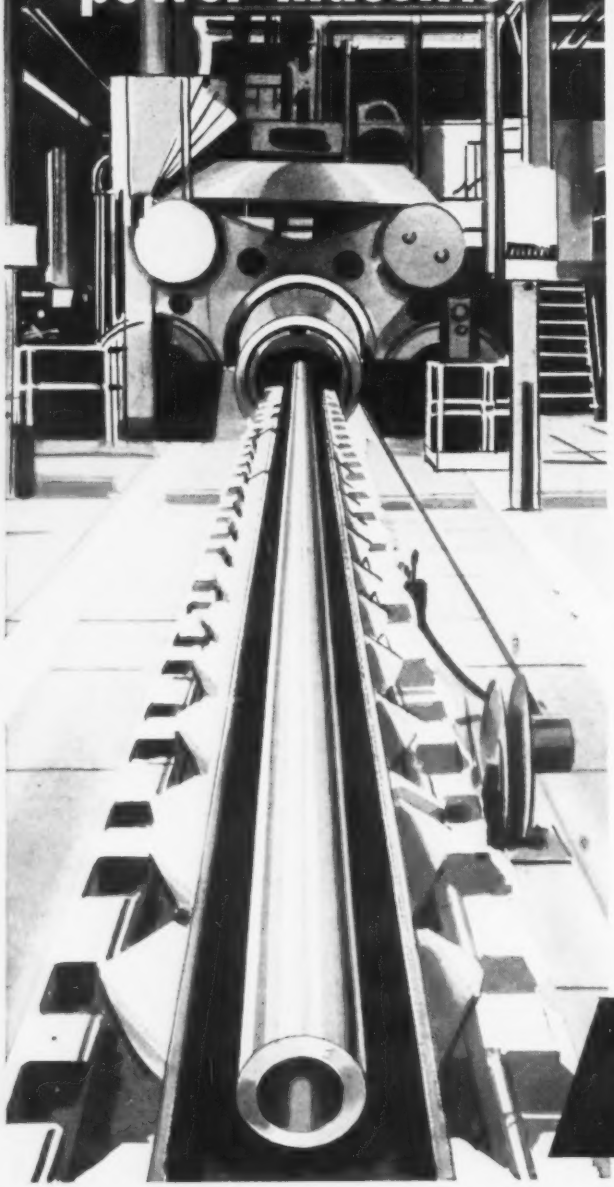
Northeastern Steel also melts with Lectromelt®

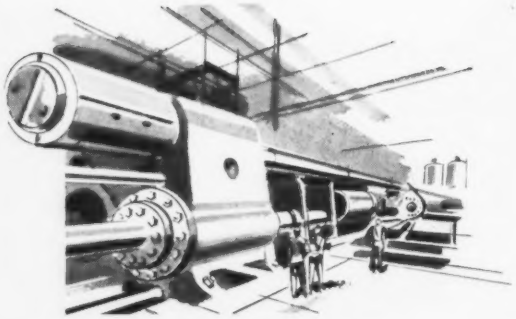
Two new MT Lectromelt Furnaces give Northeastern Steel Corporation of Bridgeport, Connecticut, an average daily capacity of 350 tons of alloy, tool and specialty steels.

Ideally located for serving the needs of New England, Northeastern Steel offers a complete range of carbon and stainless steels—*certified* high-grade alloys for exacting uses like antifriction bearings, aircraft and machine tool applications. These two Lectromelt Furnaces provide the flexibility and dependability which assure uniformly high-quality steels.

Lectromelt Furnaces are described in Catalog No. 9-A. For a copy, write Lectromelt Furnace Company, 312 32nd Street, Pittsburgh 30, Pa. *(a McGraw Edison Company Division).*

For longer life, higher performance in the petroleum, chemical and power industries





Corrosion-Resistant, Heat-Resistant EXTRUDED Steel Pipe

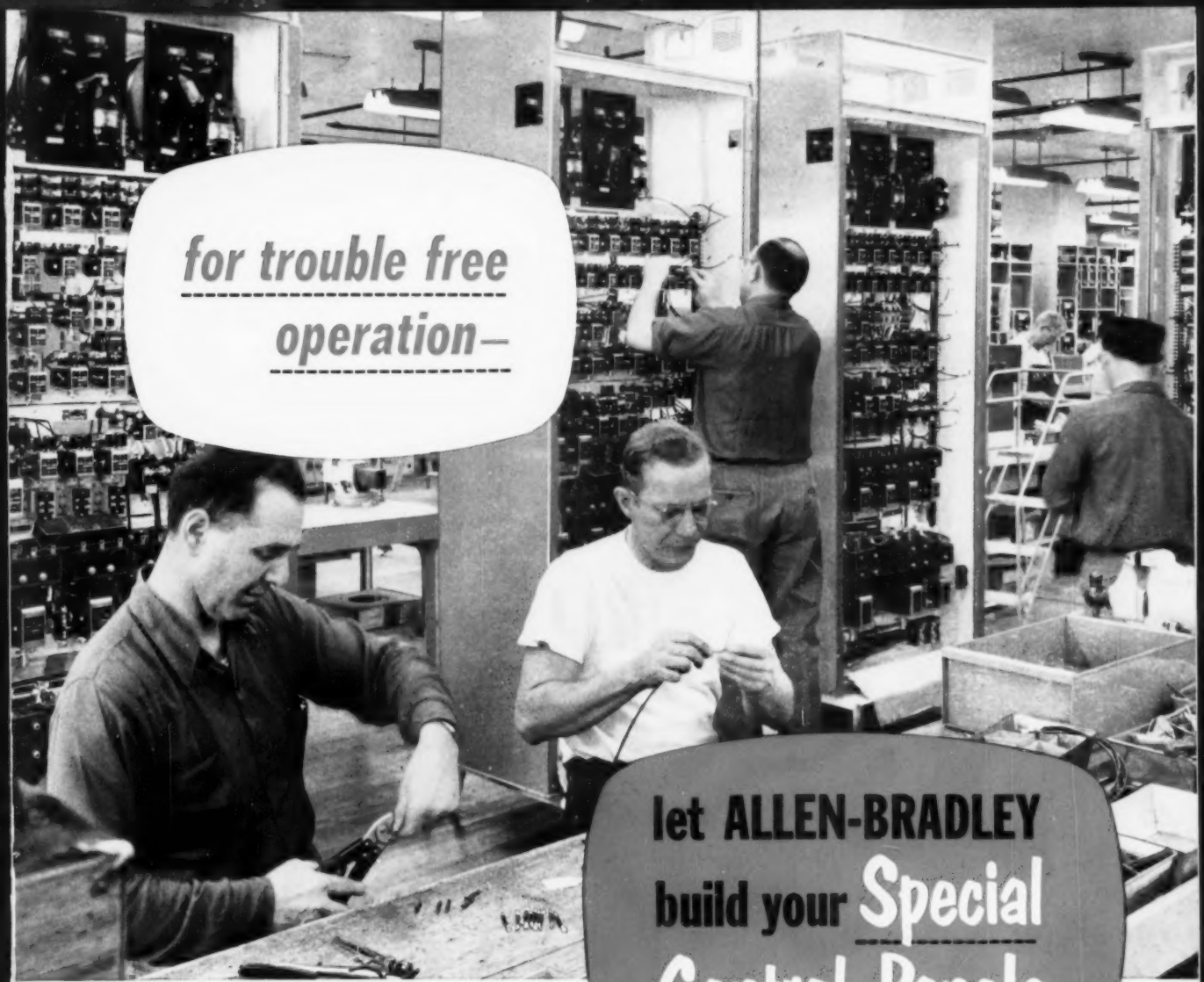
Curtiss-Wright's Metals Processing Division now offers the petroleum, petrochemical and power industries a line of high-quality, extruded steel tubular products to meet the most severe demands of modern processing. Inherent corrosion and heat-resistant properties of the steel alloys used are amplified by extrusion because the finished tube is produced with only one heat, in one pass of the giant 12,000 ton press . . . formed under compression in a matter of seconds without seams, in lengths up to 50 feet. Extra margins of resistance to corrosion and heat are built in easily by extruding heavier pipe wall thicknesses at no sacrifice in production speed. The most up-to-date quality control facilities, including ULTRASONIC TESTING, are employed in production.

Curtiss-Wright's extrusion facility is a specialty mill, ideally equipped for the production of special purpose, premium quality tubing. Conformance to A.S.T.M. specifications and other exacting standards is assured by an experienced engineering staff and the most modern metallurgical testing equipment.

When higher pressures and temperatures, or more corrosive service conditions demand more than the ordinary in large diameter pipe, let Curtiss-Wright serve you through the nearest Metals Processing Division Branch Office, or write to the Main Office address shown below.

72 Grider Street, Buffalo, New York

METALS PROCESSING DIVISION
CURTISS-WRIGHT
CORPORATION • BUFFALO, NEW YORK



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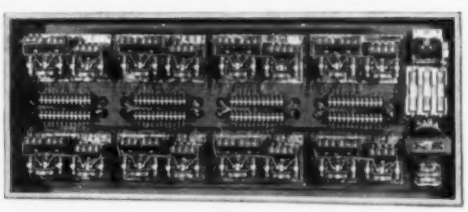
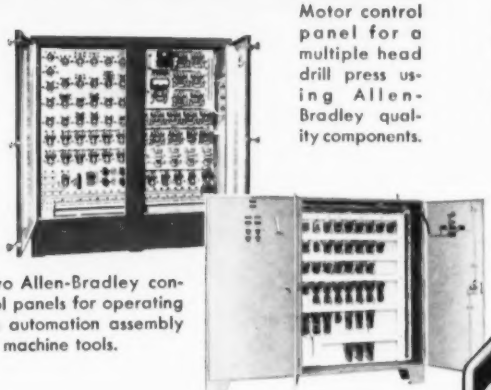
let ALLEN-BRADLEY build your Special Control Panels



Motor control panel for a multiple head drill press using Allen-Bradley quality components.



Two Allen-Bradley control panels for operating an automation assembly of machine tools.

When the control panel furnished with your production machine carries the Allen-Bradley trademark of QUALITY, your customer's approval is assured! That is why so many leading machinery builders have standardized on Allen-Bradley controls. The "simple design" of all Allen-Bradley controls is your guarantee of trouble and maintenance free service.

No matter how complex your control requirements may be, as specialists in this field, Allen-Bradley's experience may be of valuable assistance to you. Call your nearest A-B office.

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
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QUALITY

MOTOR CONTROL

A-B Quality

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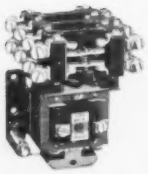
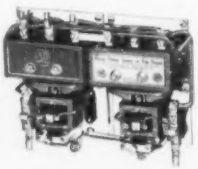
"we'll use
ALLEN-BRADLEY
Quality Motor Control
...it's trouble free!"

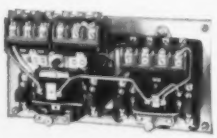
SPECIFY THESE RELIABLE MOTOR CONTROL UNITS



Bulletin 700
Universal Relay with
N.O.—N.C. Contacts

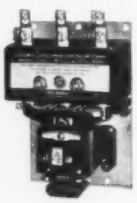


Bulletin 705 Size 2
Reversing Starter

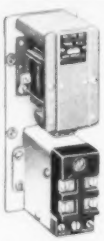


Bulletin 715 Two
Speed Consequent
Pole Starter

Bulletin 802T Adjustable
Lever Oiltight Limit
Switch



Bulletin 702 Three Pole
Size 2 Contactor



Bulletin 849 "On-Delay"
Pneumatic Timer

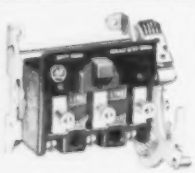
Bulletin 892
Handy Terminal
Blocks

Bulletin 704, Mechanically
Held, Hum-free Relay

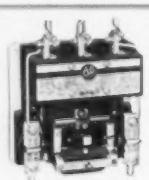
Bulletin 200
D-C Relay

Bulletin 350
Reversing Drum Switch

Bulletin 836
Pressure Control in
NEMA Type 4 Enclosure

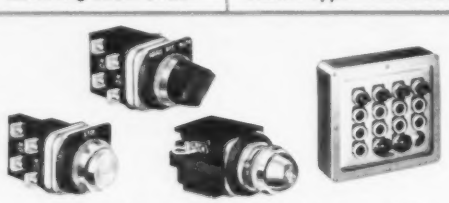


Bulletin 894
Visible Blade
Disconnect Switch



Bulletin 709
Size 4 Automatic
Starter

Bulletin 609
Three Phase
Manual Starter



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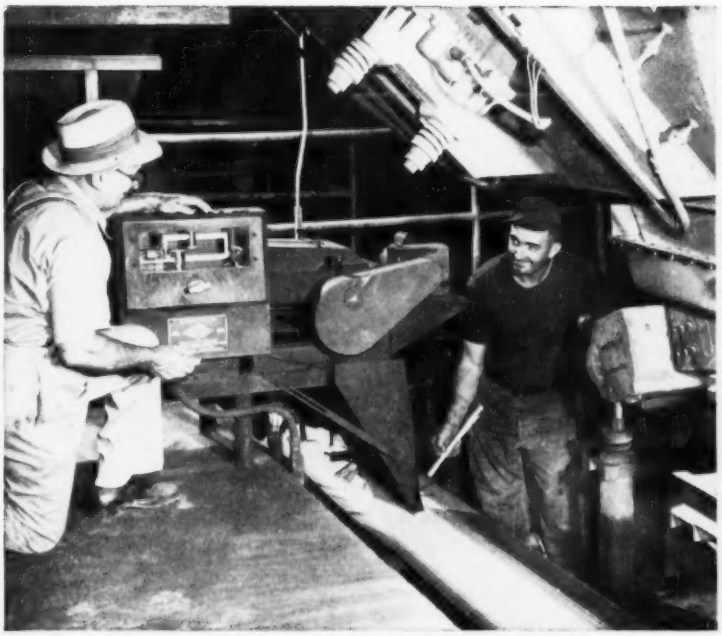
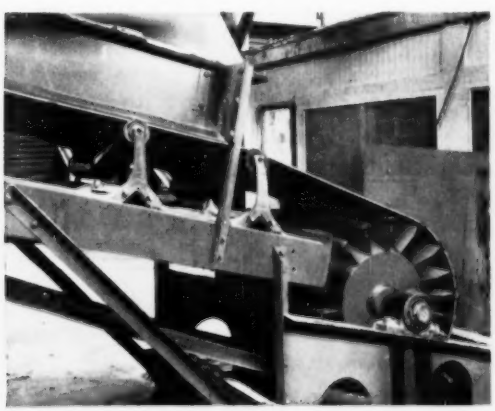
3-57-MR

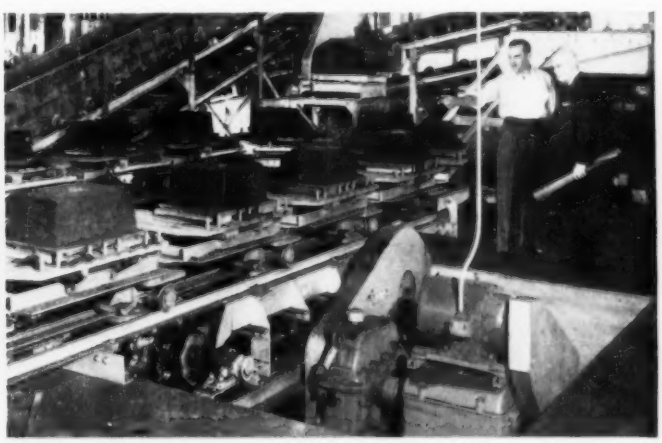


Brick sales booster: Giving the customer the color he wants helps sell bricks as well as autos. The Stone Creek Brick Co., Stone Creek, Ohio, gets the *exact* color in every batch by proportioning brick ingredients with Jeffrey Waytrols. You'll find these electric vibrating feeders in hundreds of processing plants . . *automatically* weighing and delivering *exact* quantities of material for top quality products. Bulletin 841 gives data on Waytrols.

How's your drive? If you're driving a mixing drum or other equipment at an inclined angle, you can cut the wear with this new Jeffrey "offset" chain. Jeffrey chains and sprockets are available for thousands of power transmission and conveying jobs.



Solves sticky problem. Ordinary belt conveyor pulleys often collect sticky or abrasive material on their solid faces. This wears out the belt and gets it out of alignment. Here's Jeffrey's answer: the slatted wing type pulley, described in Bulletin 898. It is self-cleaning. Belts last longer. Downtime is checked.



Thinking about automation? You should see some of the latest foundries! Materials are being moved and processed like clockwork . . . at the push of a button. Did you know Jeffrey is the leader in this field? Our service includes not only unit machines but completely engineered foundry systems, like that shown.

Mechanize it with Jeffrey machinery and save. Your materials-handling and power transmission equipment will give more efficient, economical operation if you specify time-tested, dependable Jeffrey products. Convenient stock parts carried by authorized distributors. The Jeffrey Manufacturing Co., Columbus 16, Ohio.

JEFFREY

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The unique air-blast test device shown above makes possible one of the most accurate accelerated spalling tests in the basic refractories industry.

Following is an example of how Kaiser Chemicals research laboratories use the test to help develop Periclase Chrome brick with stronger bonds, lower thermal expansion and higher conductivity (the three "musts" for spall-resistant brick):

"Whistling Wind" Creates Heat Differential

First, 3″ x 3″ x 6″ samples of pre-fired brick are placed in a furnace and brought up to test temperature.

Next, the samples are removed from the furnace and placed immediately in the test device. Unheated insulating brick cover all sides and the bottom of each hot sample, leaving only one 3″ x 3″ end of each brick exposed.

Then, high-pressure jets of cold air are blown directly onto the exposed ends of the glowing bricks. This "Whistling Wind" air blast shock-chills one end of each brick . . . while the rest of the brick remains red-hot!

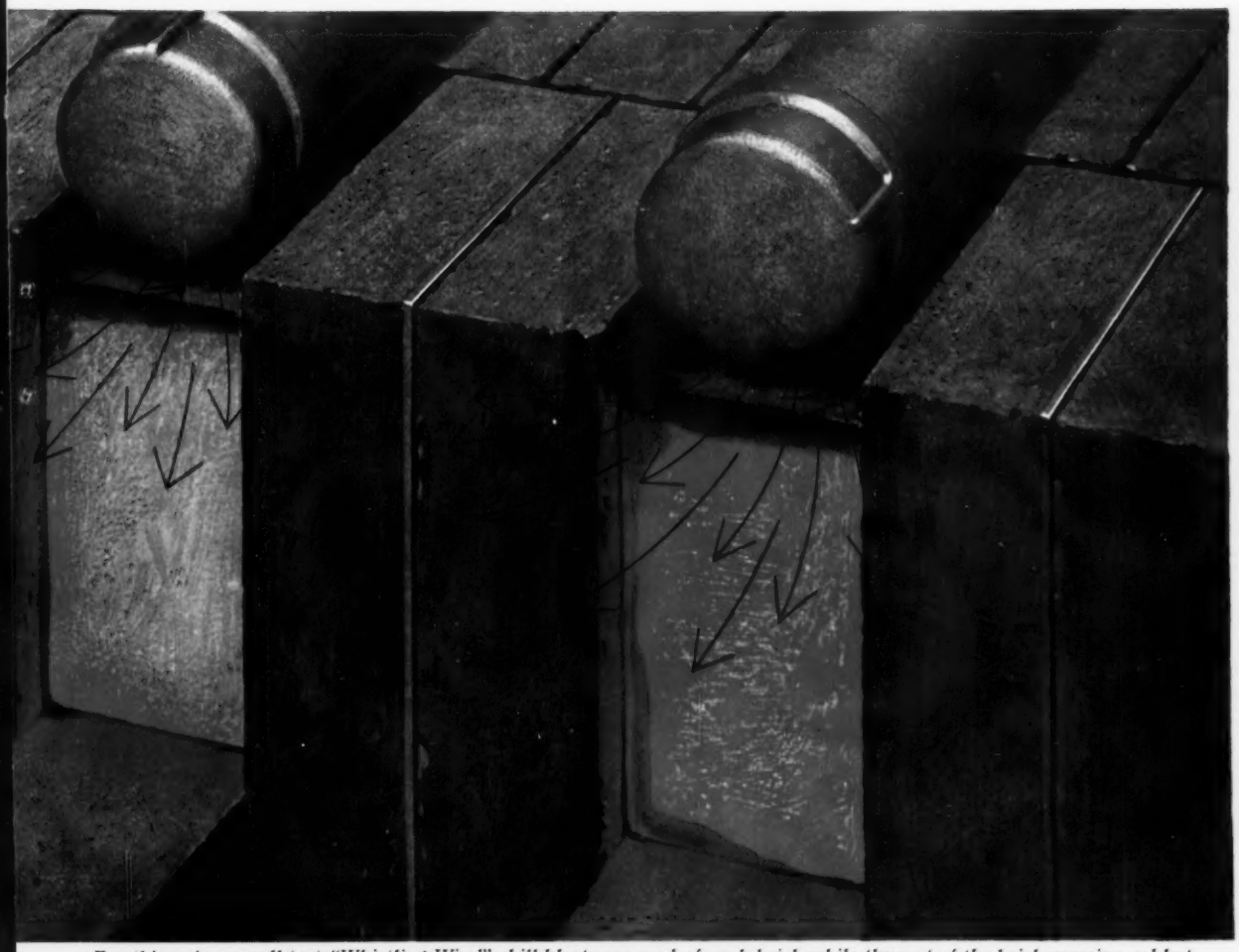
Tests Brick's Ability to Resist Spalling

After a measured air-blast cooling period, the bricks are inspected and cracks (if any) recorded. The bricks are then placed in the furnace again to repeat the cycle. A record is kept for each test cycle, and failure is recorded when a brick separates.

Research Lengthens Brick Service Life

This unusual test is just one example of the thoroughness and originality of Kaiser Chemicals Research. From it—and from many other unique tests—come special refractory compositions such as Kaiser Periclase Chrome brick that assure open hearth operators of less spalling, less swelling and greater resistance to alteration by oxides and slags. Good reasons why more and more open hearth operators say:

"Kaiser Periclase Chrome Brick Last Longer"



For this unique spall test, "Whistling Wind" chill-blasts one end of each brick while the rest of the brick remains red-hot.

MORE REASONS WHY KAISER PERICLASE CHROME BRICK GIVES YOU BETTER SERVICE:

1. **Low Chromite Content.** Chromite content is the minimum amount necessary to provide thermal shock resistance, (only 9.1% Cr_2O_3). Lowering of chromite also reduces swelling in presence of iron oxide, thus minimizes buckling and peeling.

2. **Uniform High Strength** because the ceramic bond is formed *BEFORE* the chemical bond burns out.

3. **Outstanding Dimensional Stability** because there is no liquid phase in the conversion from chemical to ceramic bond. Nothing "melts out" to cause distortion or shrinkage.

4. **Excellent Resistance to Chemical Attack** by furnace fumes, iron oxides and slags is assured by high magnesium oxide content, maximum brick density, (low porosity), and chemically stable composition.

Call or write Kaiser Chemicals Division, Dept. S6131, KAISER ALUMINUM & CHEMICAL SALES, INC., at any of the addresses listed below.

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NEWSFRONT

Unions Court White-Collar Workers

Top AFL-CIO brass have settled it; are sending 120 top-drawer union organizers out to show nation's 14 million white collar workers the light. Unions concede the going will be rough. Initial moves: get organizers into plant "front offices," banks, stores, government bureaus to get the spadework started. White collar workers are last great non-union group.

Steel Profits: Probe Coming Up?

The long-smouldering question of whether or not Congress will hold a full-dress probe of steel prices and profits may come to a head within a week or so. The Joint (Senate-House) Economic Committee reports March 1 on the President's economic message; may include probe decision then. Its been gathering data for over a year.

May Mean Lower-Cost Alloys

Research data due for publication in mid-1957 will define some mechanical properties of 99.9999+ pct pure iron. Data will help show how aluminum, manganese, other alloying elements actually function in steel. Possibilities include development of simpler alloys, offering complex-alloy properties with fewer elements; and substituting high-strength, high-heat alloys requiring less costly—and less critical—materials.

What Interests Metalworkers?

What subjects are of chief interest to the metalworking industry these days? Answers, according to a recent SAE survey, are: ceramic cutting tools, plastic tooling, "cookie cutter" dies, titanium, and vacuum melting and casting. These drew top billing from production officials.

Strip Packaging Costs Down

A two-thirds reduction in slit strip packaging costs has been achieved by a major warehousing firm. Secret of the cost-cutting lies in company's pairing of an automatic-type steel strapping unit with an automatic feed design, worked up by firm's own engineering staff. Packaging takes seven seconds; is now a one-man job.

Magnets Clean Rolling-Mill Coolant

Magnetic separators—helping comb contaminants from cold-rolling-mill coolants—are producing big savings. In some instances, tank clean-out schedules have been moved back from weekly to once every four months. At same time, costs of manually cleaning pressure filters and of coolant requirements are down.

Is Furnace-Order Picture Changing?

Auto companies have stopped ordering large furnaces, says one builder. He reports there are still scattered orders for light replacement units, but he doesn't see carmakers buying major furnaces for another year. However, major steel mill and other orders are keeping builders busy. Same source has solid orders booked for two years ahead.

New Short-Work-Week Plan

Steel labor has dreamed up a new approach to the short work week. Objective now: a three-month vacation every five years. The union figures management may buy this quicker than it will a six-hour day or four-day week. Reason: six-hour plan would cost 94¢ an hour, four-day plan, 70.5¢. Long vacation scheme would cost only 11¢, union strategists say.

Answer To Early Cutter Failures

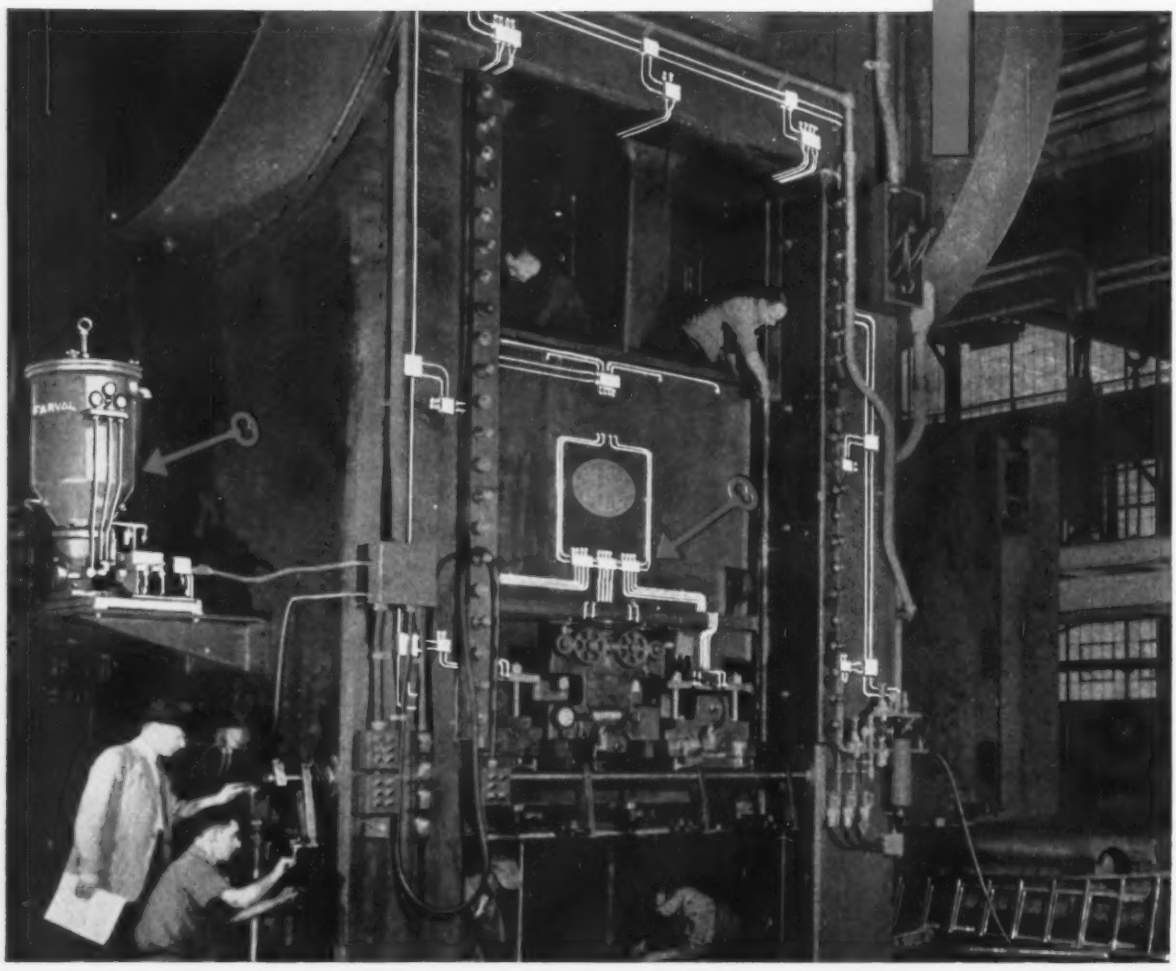
If your cuutters fail prematurely, periodic errors in the machine tool may be at fault. Australian research suggests this; points out an answer. In one case, single-fluted carbide cutters failed prematurely when routing aluminum alloy at 3000 fpm. Redesigned tool geometry and a switch to another cutter material gave longer working life.

More Carbon Steel in Motors

Makers of small, intermittent-service electric motors are making increased use of carbon steel. Example: One small motor plant now orders only one-third the electrical sheet it used in 1953. Compared with the '53 total, carbon sheet consumption is running 30 times as much as previous requirements.

Farval guards bearings as press pierces projectiles from hot billets

FARVAL—
Studies in Centralized Lubrication
No. 187



• One of the most recent developments in transfer presses, this giant Bliss pierces 105 mm projectiles from hot billets. Heat becomes so intense during operation that two internally water cooled punches are needed at each station—and they are used alternately.

With heat like this, adequate lubrication of bearings is vital. That's why a Farval Centralized System of Lubrication was installed by the press manufacturer. Farval delivers a measured amount of clean lubricant at regular intervals to every bearing. There's nothing hit-and-miss about Farval, as an indicator at each bearing shows positive proof that its individual lubricant measuring valve has functioned.

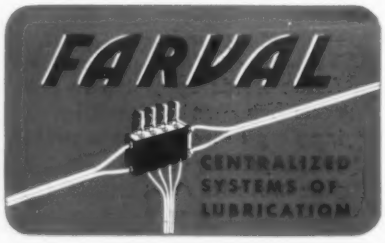
Let Farval solve your lubrication problems, too. For complete information, write for Bulletin 26-R. The Farval Corporation, 3282 East 80th Street, Cleveland 4, Ohio.

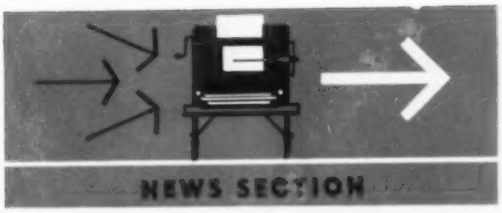
Affiliate of The Cleveland Worm & Gear Co., Industrial Worm Gearing. In Canada: Peacock Brothers Limited.

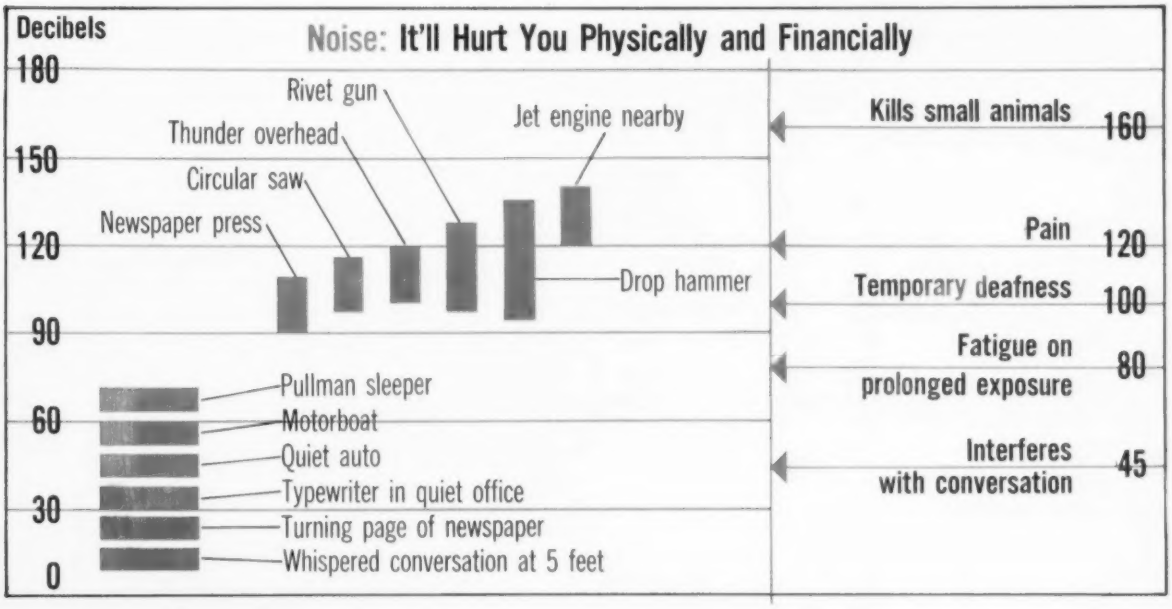
KEYS TO ADEQUATE LUBRICATION—

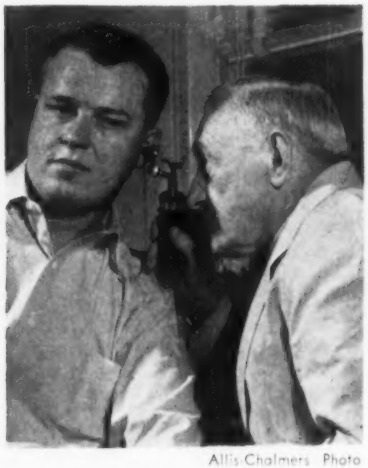
Wherever you see a Farval central pumping station, dual lubricant lines and valve manifolds, you know a machine is being properly lubricated.

Photo shows workmen assembling Bliss Projectile Press, Farval systems very much in evidence.









Allis-Chalmers Photo

How To Control Plant Noise

Excessive noise costs business $4 million every day . . . Expert advice and protective measures can cut claims . . . Hearing loss claims mount as states legislate—*By G. G. Carr.*

◆ DON'T LOOK now, but plant noise could be tapping your corporate till.

Before World War II, the Celotex Co., estimated that noise was costing American business $2 million a day in efficiency loss. With inflation, the figure today may be as high as $4 million.

And don't overlook the business office.

Aetna Insurance Co. found that a noise-suppression program in its offices boosted general efficiency 9.2 pct, cut typing errors 29 pct, and machine operators' errors 52 pct. Employee turnover was cut 47 pct.

Aetna estimated that its program brought net savings of $58 per employee in the first year.

Claims Are Costly

While efficiency loss may be classed as intangible, there's another side to the plant noise problem that bears looking into: potential worker claims for loss of hearing—and how to head them off.

Here are a few facts:

Claims for occupational hearing loss already top $2 billion.

Unions are keeping a sharp ear tuned to the problem and are geared to protect their members' interests.

Growing emphasis on automation is exposing more workers to noisy working conditions.

Medical experts agree that long exposure to noise can and does cause hearing loss.

Two ways to tackle the problem:

1. Scout your plant for ways to stop noise at its source.

2. Set up a system of worker hearing examinations.

Noise control is no job for amateurs. Bring in some expert help. Trained people are available from state agencies and insurance companies. Private consulting agencies can do a good job. And don't

TECHNICIAN is using the Soundscope to seek the source, measure and analyze potentially dangerous industrial noise. It was developed by Mine Safety Appliance Co.

Three Principal Ways To Fight Noise

1. To Eliminate at the Source:

Redesign machinery to make it less noisy. Equip moving wagons with rubber tires. Attach mufflers to air hoists. Install wood block or similar flooring instead of cement. Use belt drives.

2. Insulate the Noise

Enclose noisy parts of machines. Build an insulating booth, from which a worker can control the machine without hearing the noise. Use wide spacing between noisy machines.

3. Protect Workers

Provide personal devices such as ear plugs or ear cushions. Hold regular hearing examinations. Carry out plant education program.

SPECIAL REPORT

overlook your equipment suppliers.

For control at the source, noise specialists recommend "building it in" wherever possible. There's more than one way to skin a cat—or perform a plant operation.

Some Basic Methods

For instance, small mufflers can be fitted to air tools. Chutes, hoppers, tumbling barrels, and the like can be lined with noise-deadening materials.

Keeping stock rigid in machine tools will help. Special spring-lined stock tubes are available for automatic screw machines and like equipment. And many of these wrinkles pay a bonus in more efficient machine operation.

While each noise source is a special problem, the experts have many tricks up their sleeves, can often get good results with little fuss or cost.

How do you find out whether your plant is dangerously noisy or safely quiet?

Sound experts have developed an instrument called the "decibel meter." A "decibel" is a generally-accepted measure of sound level. The danger point is generally taken to be about 90 decibels. But that's putting it too simply.

Dr. Charles Williams, director of industrial hygiene services, Liberty Mutual Insurance Co., warns: don't just buy a decibel meter and wander around your plant taking readings.

Aside from the need for special training to take and interpret noise-level readings, the decibel level alone is not enough to properly evaluate noise levels. Noise must be further broken down into frequency banks to make the data mean anything. An auto engine generates about 90 decibels when starting, but at too low a frequency to do any harm.

Examinations Help

Worker hearing examinations can head off potential grief and benefit the worker as well. Many companies are running the risk of being held liable for hearing damage done long before the worker was hired. One of the big problems in hearing compensation is deciding how much damage has been done and when it happened. Only sure way of escaping blame for all the damage lies in proper medical records.

Many of your workers probably already have some hearing loss. Dr. Meyer Fox, chief, Ear, Nose, and Throat Dept., Mt. Sinai Hospital, Milwaukee, cites studies showing an average plant worker hearing loss of about 28 pct. In a drop hammer plant, this can run as high as 40 pct. Allis-Chalmers found that 25 pct of 3000 new employees had some type of hearing loss.

A point to remember: 25 pct hearing loss has already been established in some areas as more than enough to qualify a worker as partially disabled, entitle him to compensation.

To compound the confusion, continued exposure to loud noises can bring temporary partial deafness, or "temporary threshold shift." It can take weeks and months in quiet surroundings for this condition to disappear; although usually it will wear off overnight.

Damage Suits Mount

But without proper medical records, only time can tell whether the hearing loss is permanent or temporary. And the courts have held that workers are entitled to temporary partial compensation while they are finding out.

How Allis-Chalmers Cut Noise Levels

Replace loose bearings.

Decibel Reduction 8 to 10

Where compressed air is used to blow chips from recessed parts, perform operation in small cubicle lined with acoustical board.

Decibel Reduction 12 max.

Line bar stock feed tubes of six-spindle automatic screw machines with coil springs.

Decibel Reduction 10

Install mufflers on exhaust end of air vises.

Decibel Reduction 15

Cover metal tops with wood.

Decibel Reduction 15 max.

All these factors make it easy to get hit with damage suits for hearing loss. And all the evidence shows it's going to get still easier.

So far, only New York and Wisconsin have formal schedules for compensation for deafness from occupational noise. But Joseph Sullivan, manager, compensation and employers' liability, Liberty Mutual, warns; there is a growing trend to consider loss of hearing an occupational disability whenever the patient works in noisy surroundings.

This new view brings such cases under workmen's compensation, has already opened the door to about $2 billion in damage suits. One large company in New Jersey is now busy settling an aggregate of $5 million in claims.

Records To Keep

Regular hearing examinations are a must. They should be done as a standard part of the preplacement physical, at the end of a 60 or 90-day probationary period and at regular intervals of about a year thereafter. If you have regular physical examinations, the hearing check can easily be run then, but should be done at the start of the working day.

A proper hearing examination should yield a permanent record of the worker's hearing (in decibels) at different frequencies. The record should include age, sex, type of work (past and present), description of military service and pertinent medical data (previous hearing history, ear injuries and treatments, childhood diseases and the like).

Heart of the record, the hearing level at various frequencies, can be obtained through a machine called a pure-tone audiometer. In many areas, audiometers can be rented or borrowed. A quiet, little-used room in office or dispensary may be used for the tests. Or prefabricated testing booths are now commercially available.

Medical personnel should supervise but need not administer the test. Almost anyone who shows interest can, with brief training, do a satisfactory job. Many medical schools now provide 2-day courses in hearing testing for laymen. But hearing records (audiograms), once made, must be reviewed by a physician, with corrective action taken when indicated.

Just making records and filing them away gives little legal protection, is certainly bad medicine, Dr. Fox warns. Hearing loss can often be alleviated by proper treatment, and the earlier the easier. Allis-Chalmers finds it is not necessary to transfer workers with hearing loss to less noisy departments providing (1) proper protective measures are taken, and (2) hearing loss does not progress despite protection.

How To Proceed

The best testing program will yield only an historical record of progressive hearing loss if not accompanied by a noise suppression program. Best place to control noise is at the source. Second best is control along the path of noise transmission, and third, protection of the man himself.

Ear plugs can do a fine job of filtering out frequencies which reach the hearing mechanism through the air canal from outer to middle ear. But many frequencies are conducted to the middle and inner ear by the skull and other bones of the body. And ear plugs can't help here.

A final caution by experts: Be prepared to carry out a worker education program. You can expect resistance at first, especially to ear plugs. But experience in other plants has shown that resistance can quickly change to support when aims and effects of the program become apparent.

IF WEARERS hear anything from their headsets, they will be disturbed and surprised. The units are Noisefoes, developed by Mine Safety Appliance Co. They reduce the high intensity sound of jet engines being tested.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., THE IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

EDUCATION

ENGINEERS: Colleges Fight Bottleneck

Applications swamp tech schools . . . But few qualified students are being turned down as yet . . . Trend indicates facilities will have to expand to handle demands of population and industry.

◆ WHERE IS the bottleneck in engineering education?

Increased applications at technical schools show scholarships and publicity are getting more boys interested in engineering. Number of would-be engineering students far exceeds ability of technical schools to accept them.

But are potential engineers being turned away now for lack of college facilities?

Answer seems to be that few, if any, qualified students are losing out because of crowded conditions in engineering colleges—yet. Schools are lopping a few more names off the lower ends of application lists. But there has been surprisingly little change in the cutoff point. A boy who could get into an engineering school 15 years ago would probably be admitted today.

Squeeze Coming

However, a serious squeeze is building up. Applications are increasing sharply at engineering schools. Population figures indicate this trend will continue. Engineering colleges can't accept many more and many are straining their budgets to take care of the present load.

The situation of one leading engineering college points up some of the problems. Pittsburgh's Carnegie Institute of Technology received 3100 applications for admission to its engineering school last fall. Of these about 400 were eventually taken in. Despite a ratio of nearly 8 to 1 between applications and registrations, Carnegie Tech does not feel it is rejecting good engineering prospects.

Figures on class ratings support this thinking. In 1941, 94 pct of the schools' freshmen came from the upper half of high school classes. In the current freshman group, 96 pct came from the upper half. Figures on the upper 10 pct are only 3 points apart. In other words, the school is getting only a few more qualified applicants than it was 15 years ago.

Engineering Applications Soar

Admission Statistics: Carnegie Tech Engineering College

Two conditions tend to distort the picture of how many boys are rejected by engineering schools. Of the 3100 applicants at Carnegie Tech, there are some who are obviously unfitted for engineering studies. Stories of the high pay given engineers and the publicity given the shortage of engineers have stirred some misguided notions. Many of the unqualified are persuaded to withdraw their applications.

Another group will apply at several schools at the same time. Because of this common practice, engineering schools will accept twice the number they can han-

dle. Carnegie Tech accepted 900 last year and wound up with 400 actual starters. The other 500, no doubt, had been accepted at, and elected to attend, other engineering institutions.

Nevertheless, the number of good prospects is increasing. Carnegie Tech's applications jumped by 700 last year. They were more than double the 1952 figure. As the bumper baby crop of the war years reaches college age, this trend will increase. Some expansion of college facilities is planned, but many private schools don't see where they'll get the money for expansion. Chances are they will look to industry to help ease the financial burden.

Tuition Doesn't Pay

Carnegie Tech figures its tuition of $750 pays about 60 pct of cost of educating an engineer. The remaining 40 pct comes mostly from endowment funds. Carnegie Tech's $30 million endowment yields $1.25 million. This amount, plus tuition, leaves a yearly deficit of $635,000. The school will get the extra money through fund raising efforts but it can't increase freshman enrollment beyond 400 without getting deeper into the hole.

Industry Helps

A number of companies have recognized this problem in their educational aid programs. They are supplementing straight scholarships with grants to the schools.

This is still a new development, however, and most companies stick to straight scholarship aid.

For the really outstanding high school student, the bidding is still brisk. One educator told of a company scholarship program that called for 10 tuition awards. Twenty-five finalists were selected. In order to fill the awards, the committee had to go down through the lowest finalist. Top men had better offers.

Industry and the schools have done a good job of making known the scholarship and career opportunities in engineering. They have stimulated interest. Students today shop around for schools and scholarships. This complicates the job of determining how many college desks will be needed tomorrow.

PERSONNEL

EXECUTIVES: Mad Market?

Shortage of homegrown talent pushes many firms into recruiting to fill high level vacancies . . . Companies having management development activities do better.

◆ IS THERE a mad market in executives?

Some firms are finding it hard to develop "homegrown" executives. Forty-two pct of the companies in an American Management Assn. survey are going outside the firm to fill more than 10 pct of their top and middle management positions. Another 43 pct indicate they use recruiting for 10 pct or less of their high-level hiring. Only about 15 pct of the firms promote almost exclusively from within.

Firms with management development programs (seven out of ten in the AMA sample) seem to be making out the best. More than half of them are able to fill at least 80 pct of their executive vacancies from inside.

An IRON AGE check of firms in the Philadelphia area indicates the executive market might be easier if top management weren't so choosy.

"We'd be able to fill our vacancies easier if the requirements weren't framed so rigidly," says one personnel director. "Most of those who draw up job specifications wouldn't pass favorably on their own applications."

Job the Same?

The main reason for going outside to fill jobs is need to obtain broad experience not available within the firm itself. And in such cases careful screening of applicants is a must. While their present job title may be the same, their previous duties and responsibilities may have been far different than those wanted.

Generally, however, firms are satisfied with the results they get when they hire from the outside. In the AMA survey, most companies reporting indicate at least four out of five recruits turn out well. Small companies do worse than big ones in proportion of satisfactory recruits.

It takes time to fill high level jobs. Two-thirds of the companies report they can fill top-management positions within six months, middle management jobs within three months as an average. However, many companies take nine months, a year, or longer to fill top and middle management jobs.

Questions, Questions?

Getting a job isn't an easy matter, either. When top management posts are being filled applicants usually go through at least two interviews, sometimes as many as four or five. Decision to hire is usually made by top management or by a group of persons. Only in one-tenth of the companies questioned is choice left to the executive who'll be the applicant's superior.

In filling middle-management jobs two, three, or four men interview candidates. Hiring decision, in most cases, is made jointly by some members of top management. In only about one company in four does the recruit's immediate superior have the final say-so.

There are several reasons why executive recruiting is now getting more attention. One is the doubling or tripling of company size since the war. Another is the increasing complexity of management — bringing a demand for stronger, more highly skilled executives.

Such programs are important. One personnel man told AMA, "The better we establish an internal plan for the selection, development and placement of management personnel, the less emphasis we will place on recruiting."

LABOR

PERSONNEL: Long-Range Trouble Ahead

Labor is quiet but big personnel problems are coming . . . Need to cut costs and improve productivity could explode . . . Situation is aggravated by shortage of management and skilled labor.

◆ IF THE FORECASTS are correct, industrial labor will be relatively quiet this year.

"But so is a timebomb," remarks one personnel executive. Management has two problems that have shortened that bomb fuse, he pointed out to an American Management Assn. personnel meeting. They are an acute shortage of management, engineering and skilled worker personnel; and a real need to reduce labor costs in the competitive years ahead.

J. M. Bertotti, of General Electric Corp., foresees no relief from the tense situation. If GE forecasts are correct, the nation will hit a $500-$600 billion goods-and-services output by 1966, a 40 pct increase.

In that time, the labor force will increase by 13 pct. In the past 15 years, we've added 13 million to the national work force, half of them women. In the next 10 years we need another 11 million workers.

One bright note: labor will not push for a 4-day workweek, Mr. Bertotti believes. Workers want a 5-day workweek, but premium pay for that fifth day. When labor opinion is carefully boiled down, the worker is less interested in leisure time than in more pay. Even so, we will need workers, Mr. Bertotti feels.

We will use more elderly workers, more women, more labor drained from farms. It may not be enough. We have 9,000,000 skilled workers. We need 250,000 skilled workers immediately. Only 100,000 are in training. Despite the fact that GE, for one, spends $35,-$40,000,000 annually on employee training.

Some partial relief plans:

Minnesota Mining & Manufacturing is attacking the manager shortage with a manpower requirements "forecast" that will predict manpower needs for each division of the firm at least 3.5 years in advance. The ratio of managers is figured against each division's sales forecast.

According to W. W. Burton, 3-M employment manager, the system works. Percentage of turnover is computed, the total number of managers needed per year is multiplied by this figure, and the number of expected retirements is added to the resulting total. The formula is simple, yet accurate to within 1 pct. When a new manager is needed, he is already in training and ready to assume the job, since the firm has planned his moving into the new job months, or even years, in advance. The same applies to salesmen. Minnesota Mining estimates six to nine months are required before a salesman begins to pull his weight. With the forecasting system, the man is trained and ready at the moment when the rising sales curve merits his joining the field sales force.

Keep Him Happy

The already trained, experienced manager or executive who's hoped for a particular job, and been bypassed, can often be kept. He may not walk out, according to Detroit Edison Company, if a definite plan for holding him in the company has been developed.

Management rules: (1) Demonstrate job selection is impartial and worthy of the employee's respect; (2) Selections must be announced as rapidly as possible, not leaked via company grapevine; (3) Management must tell the loser exactly why he didn't get the job and what he needs to do.

Personnel Men Are Saying About 1957—

"Avoid as you would the plague . . . negotiation whereby you create a joint (union-management) committee to administer a program of job evaluation or a joint committee to undertake joint time studies and create jointly resulting incentive labor standards. . . ."—E. F. Scotten, Maytag.

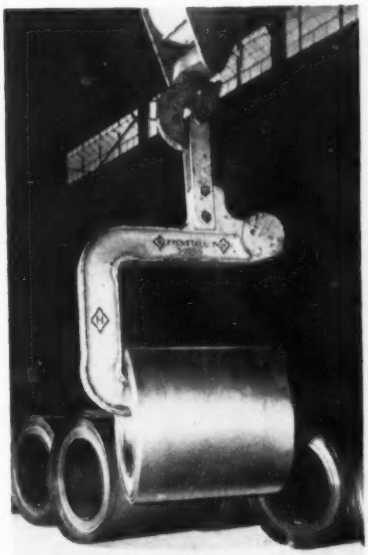
"Managers can't be found and hired from the outside, except in relatively few cases, and therefore must be developed within the company."—D. E. Balch, General Mills.

"I appeal to you to talk about "wage cost inflation," think about it, study it. The inflation we talk about so much today is just that, wage cost inflation. . . ."—Murray Shields, MacKay-Shields.

"In the decade ahead we will need 11,000,000 more in the work force and we can't see where they are coming from. . . ."—J. M. Bertotti, General Electric Corp.

"We have 500 engineers and 400 business administration graduates in a class of 5000, and we need more. There are 10-40 pct more business firms interviewing our graduates than there were one year ago. . . ."—Dr. Harlan Hatcher, University of Michigan.

Product	Old Price (base and extras)	Increase Per Ton
Plate	$120	$6.00
Hot-rolled Sheet	123	3.50
Hot-rolled Strip	137	4.00
Cold-rolled Sheet	139.50	4.25
Cold-rolled Strip	206	6.00
Enameling Iron	161	5.00
Galvanized	167	5.00
Hot-rolled Bars	124	4.00
Cold-rolled Bars	202	5.00
Structurals	113.50	4.00
Stainless	1229	50.00
Wire	167	5.00
Alloy	261	10.00



How Steel Costs Climb (Above are estimates of large manufacturing company. Figures include extra and base price increases since last general price increase in 1956.)

STEEL PRICES: On The "Up" Escalator

Increases in extras and selected bases average over $5 per ton since last August . . . Many users grumble . . . Others would trade higher base prices for greater steel availability . . . Steel had no choice.

◆ STEEL PRODUCERS have dropped the other shoe. The pressure of higher material and labor costs has forced sweeping increases in steel price extras, plus base price boosts on a substantial list of steel products.

This just about completes the round - robin of price boosts touched off by last year's steel wage hike. For some products, it was the second time around on base prices. But for most items it was a follow-through on extras to what was started last August with an $8.50-a-ton base price increase.

Steel users were still toting up the cost this week. Some already had a good idea of how much their steel bills have gone up.

The purchasing agent of a large electrical equipment maker figures his average boost at about $5.20 per ton, covering a wide range of products. His stainless steel prices are up $50 a ton. A big fabricator comes up with an estimate of $5.30 a ton on plates and $5.50 to $6.00 on structurals.

Eight major users in the Midwest figure the boost precentagewise in a range of 4.25 pct to 10.3 pct. On the basis of THE IRON AGE finished steel composite price, this would amount to approximately $4.90 to $11.50 per ton.

An auto frame producer says his steel costs are up $7-8 per ton on hot-rolled sheet. Northeastern consumers estimate the average increase at 10-11 pct. Prior to the latest series of base and extra revisions by U. S. Steel Corp., and others, a large manufacturer of office machines figured that carbon products were up 8 pct, stainless 6 pct, and alloy 7 pct.

The increases largely reflect upward revision of steel price extras. But base prices also were up on seamless standard and linepipe, buttweld pipe, oil country casing, tubing, and drill pipe; carbon seamless mechanical and pressure tubing, and stainless steel.

Absorb Or Not?

Some users accepted the increases with a shrug of the shoulders. Others, wondering whether they could pass along the higher costs, grumbled, some in picturesque language. A major welding equipment and supply company complained about the paperwork involved in figuring the new extras:

"I have an inch-high pile of

these price revisions on extras from steel companies. It would take a Philadelphia lawyer to figure out just where we are. Half my time is now spent in seeing to proper filing of revised price sheets. It would be far simpler for us if they would just raise the base price instead of pushing up extras to avoid the publicity."

Actually, the major mills distributed the price announcements widely to press services, newspapers, and magazines.

An appliance maker in the Philadelphia area, a big user of hot and cold-rolled sheets, was bitter:

"The end-product manufacturer is taking it on the chin. We can't pass price increases on to the consumer. We've got to meet our competition." He figures increases in the last six months at from 2 to 3 pct.

No Alternative

Most steel buyers were sympathetic with the mills' problems. They realize that increases in raw material costs, freight, and wages are squeezing the producers' profit margins. They also recognize the need for more money to finance needed steel expansion. Users of hard-to-get plate and structurals, some of them paying premium prices to export and marginal sources, would like to see prices high enough to encourage more expansion in these products.

A leading construction firm head estimates that his structural price is now up 3-4 pct. "But," he shrugs, "I'm more interested in getting some than I am in the price."

In addition to increasing extras, the mills have continued to narrow the range of standard specifications. On plates, one user says there is no longer any such thing as a standard width. The width range for base price only was once 60 in. to 96 in.; it was cut to 60-90; then to 80-90; and now it has been completely wiped out.

Plate users have been paying anywhere from two to three times the normal mill price to sources other than their regular suppliers. Smaller companies have been particularly hard hit, although the large consumers are not immune. One big user complains he is paying $100 over regular mill price for conversion steel.

Freight is another big cost factor for plate and structural users. Many of them are buying from distant mills and picking up the freight tab.

In some cases, the mills are being blamed for a multitude of sins they haven't committed. Salesmen for some component parts makers are pointing the finger at steel producers for every increase in price, including increased cost of their own labor. For instance, where the steel in some component a manufacturer is buying from a jobber has gone up 5 pct, the jobber will raise his price 7-10 pct and blame steel for all of it. This practice has become widespread in the last two months.

A major automotive valve producer using principally 18-8 stainless steel says his steel costs have gone up from 1 pct to 7 pct, and average out at about a 3 pct increase. Extras on chemistry have been a major source of increases.

Automakers Mum

Most auto companies prefer to keep mum. One producer says his costs exclusive of last August's base price rise have risen 2-3 pct, mostly for hot-rolled and cold-rolled sheet. Another estimates a 4 pct boost covering the same products.

A Detroit area supplier of carbon bars figures that extras on the four grades he sells have gone up an average of $4 per ton.

Some steel users have not been hit by price boosts since the base price change last August. A precision bearing producer using mostly 52100 alloy bars reports "no appreciable increase." But the buyer added that his company was still staggering from the 12 to 15 pct base price increase last year.

The continuing upturn in extras has alerted steel users to the need for a close look at quality requirements.

Studies are being made to eliminate extra costs where possible. Downgrading from special quality bar to a broader carbon range bar is being looked into. Elimination of special metallurgical quality is another cost saver. Avoiding trimmed plate is another.

What Are Steel Price Extras?

Any steel buyer worth his salt is familiar with the steel price extra sheets covering various products. Price extras are charges made by the mills for special processing of steel beyond the usual "commercial" quality.

These charges are tacked onto the base price, which covers only the usual processing. Some users can get along with commercial quality in certain applications, but "extras" eventually move into the picture for just about everybody.

While complicated at first glance, extras actually are not too hard to understand and serve a useful purpose: they represent the fairest method yet devised to charge individual customers for special services. If extras were lumped into the base price, some users would be paying for something they don't get, while others would be getting something for nothing.

The mills figure extra charges on the basis of the extra cost involved. They cover a wide variety of special services, including special chemistry, physicals, widths, lengths, drawing quality, testing, quantity, wrapping, and shipping.

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Labor:

McDonald seems victorious; his margin less than 2 to 1.

It looks as though the Steelworkers' David J. McDonald is at least reelected president over his youthful opponent for the union's presidency, Donald C. Rarick.

On the basis of returns through last weekend, Mr. McDonald had polled over 188,000 votes to 105,000 for Rarick.

Mr. Rarick challenged McDonald's leadership of the union over the issue of a $2-a-month dues increase voted at the union's convention in Los Angeles last year. No one gave the contender a chance to unseat the union president, but there were a lot of raised eyebrows over the relatively close vote.

Hollow Victory?

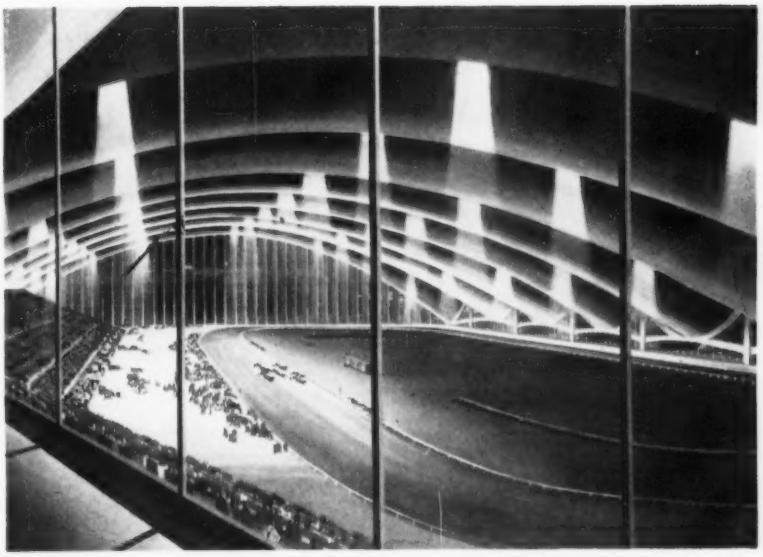
While Mr. McDonald won, the election did him no good. In fact, it probably has weakened his position as president of the union and as a national leader of labor. It also gives his opponents within the union a nucleus from which to grow more formidable opposition when the next election is held four years hence.

But the outcome could work to the benefit of both sides. For one thing, the vote pinpoints the hotbeds of opposition to McDonald policies. These include areas centering around Pittsburgh, the union's international headquarters, and in certain sections of central and eastern Pennsylvania.

Vote Is Revealing

In some ways, the protest vote provided a revealing commentary on the thinking of rank-and-file workers. Mr. McDonald has proven himself a worthy successor to the late Philip Murray, first president and one of the founders of the union. He has won many gains for the steel workers and improved on many others. And these things were accomplished without too much strife, excepting the 34-day strike of last summer. He also has his eyes set on even more contract improvements when present contracts expire in 1959, ending the first long-term pacts.

CONSTRUCTION



NEW CONCEPT in arenas, made possible by new techniques in metal fabrication and construction, will be attempted in Bronx or Queens Borough, N. Y. It will be enclosed, seat 150,000 suitable for all sports events.

ALUMINUM: Changes Skyline

Giant new arena will be of aluminum construction . . . New York skyscraper will be of anodized aluminum sheathing made by Reynolds Metals . . . It will be of gold coloring.

◆ ALUMINUM plays a continually bigger part in the changing face of New York City's skyline.

In the planning stage is the giant Olympic City, announced with fanfare as the "largest enclosed arena in the world." The structure, to house sports and other events that require large areas and seating capacities, is designed to hold 150,000 spectators.

This arena will be constructed of aluminum, with a curved roof designed without column or intermediate support. Dimensions of the arena alone will be 1400 ft by 1080 ft, with maximum height of 250 ft.

The $57,425,000 structure will be located in either Bronx or Queens. Announcement of the planned project was made by Richard D. Gittlin, manufacturer and real estate man.

On Manhattan, Reynolds Metals Co. has been awarded a contract to fabricate and erect gold anodized aluminum sheathing for a 34-story office building to be constructed at 575 Lexington Ave. Builders are Sam Minskoff & Sons.

Two factors were cited as instrumental in decision to employ gold aluminum panels for the building's facade. Tests conducted by Reynolds established the permanence of color in anodized aluminum. Reynolds has completed its new Louisville anodizing plant, "assuring that the panels will be in the hands of a single producer from bauxite to building."

In the Olympic City, either steel or aluminum could have been selected, spokesmen point out. Aluminum was chosen because of its lightness, and its maintenance-free properties.

CAMERA PHOTOGRAPHS shipment of conductor before it leaves plant and . . .

Camera New Tool For Shippers

Proving "one picture is worth a thousand words," Kaiser Aluminum & Chemical Corp. has found a way to show customers the condition of shipments leaving its Newark, O., works.

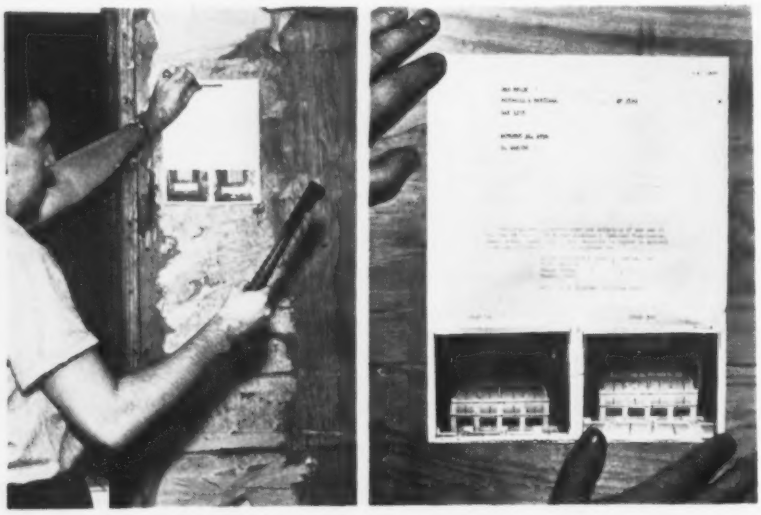
Through this customer service —using photographs of orders taken just before shipment — Kaiser is also able to get ideas on improving blocking and loading methods. The company's customers find the pictures helpful for use in receiving reports.

Here's how the method works:

When shipments of rod, bar, wire and electrical conductor are ready to roll, out come the Polaroid cameras. Photographs are taken of each end of the car.

One set of pictures is sent to the Kaiser district sales office in the customer's area. A second set is placed on the packing list tacked to the inside wall of the railroad car itself. A third set of pictures goes into Kaiser's files at the Newark shipping point.

Technique has been in operation since last summer.



. . . quickly developed prints are tacked on car wall as a record.

Barrels:

Sales in '56 up 4 pct, expect same in '57.

Steel barrel men figure last year's sales topped 1955 by 4 pct. And they are shooting for about the same advance again in 1957.

Returns are in through November. Total 1956 output is estimated at 34.5 million barrels. This is second to only the 38 million output in 1951, in post war years.

Say steel barrel men of January and February 1957, "There have been some disappointments." But there have been some gains as well. Several regions have slipped on heavy and light steel container sales, but overall, company reports speak of substantial gains.

Barrel men are not viewing 1957 with unalloyed optimism. But they do have reason for a strong forecast. Steel barrels are tied closely to chemical and petro-chemical sales. As they've gone up, so have steel barrels. Petroleum, once the mainstay of the market, is assuming a secondary position.

In 1953 about 43 pct of heavy barrels (13-55 gal. capacity) went to the petroleum market. Chemicals took 32 pct of output in this size. In 1955, chemicals had moved up to 49 pct of heavy barrel consumption. Petroleum fell to 24.5 pct.

Barrel men say they are worried about: (1) The effects of a steel price increase on customers' willingness to buy. (2) Is some purchasing being borrowed from second half business to beat an expected July increase in steel base prices? (3) Are customers' inventories already about fixed.

Steel container shipments, light and heavy categories combined.

1956	34,540,000
1955	34,234,397
1954	29,787,958
1953	31,299,109
1952	31,630,810
1951	38,053,330
1950	34,057,083
1949	20,189,551

1956—Estimate

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- There are so many advantages to stainless electricware it's no surprise that sales are skyrocketing. Homemakers like the natural beauty of stainless — the way it easily absorbs the punishment of everyday use and stays forever new with a minimum of care.
- Sharon's thorough knowledge of the utensil industry, the ability to produce specification steels of consistent uniformity, plus the finest finishes in the industry are reasons why so many of the nation's leading electricware manufacturers specify **Sharon Quality Stainless Steels.**

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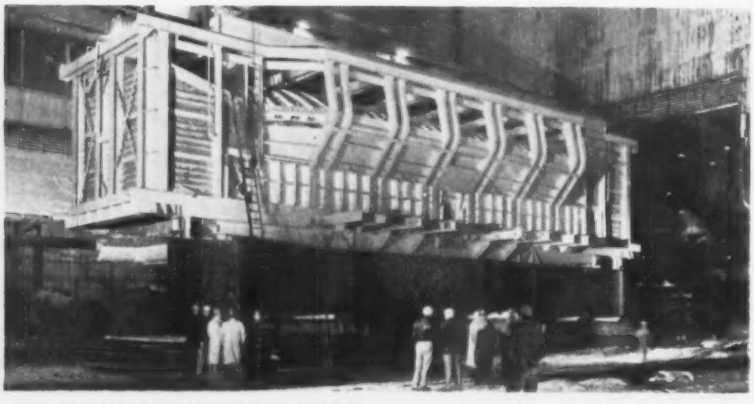
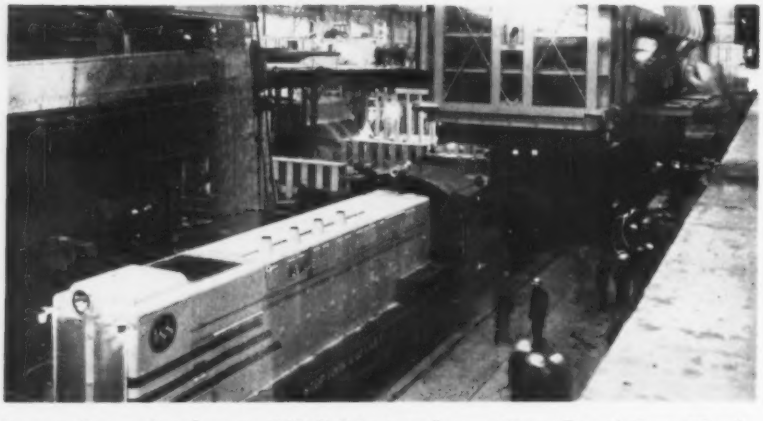
EXPANSION

OPENHEARTHS: Pre-Build Them

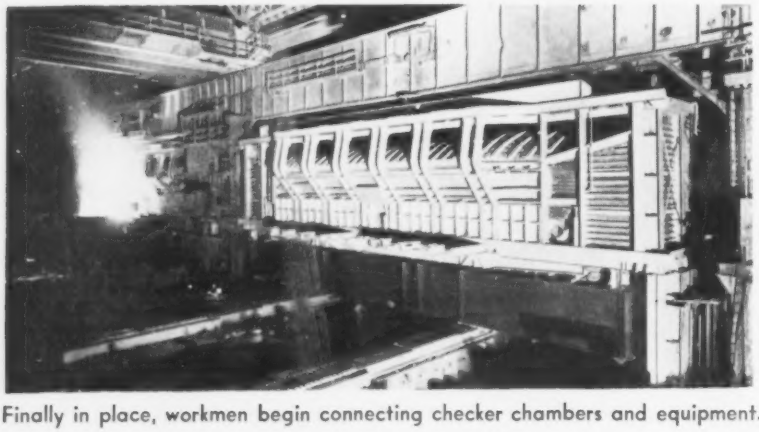
Engineers at U.S. Steel's Geneva Works build furnace on flat cars outside openhearth shop . . . Rheostat-equipped engine does the moving job . . . Method cuts downtime in half.



Prefabricated openhearth furnace is ready to be moved into shop.



Locomotive pushes furnace 900 ft into transfer position. Travel time: 78 min.



Finally in place, workmen begin connecting checker chambers and equipment.

◆ THE TECHNIQUE of prefabrication has invaded the openhearth shop.

At U. S. Steel's Geneva Works, 8 of 10 furnaces were rebuilt and enlarged in this way. And one furnace, including brickwork, was completed and installed in 11 days.

Geneva Works engineers developed the prefab and package move-in method as part of a program that will increase the plant's steelmaking capacity 20 pct by the end of this year.

In the case of seven of the furnaces, the steelwork was completed outside the openhearth shop, then moved inside, placed in position, and the brickwork installed.

Even the Brickwork

But with the last furnace, No. 6, the engineers tried a unique experiment. They built the entire furnace outside — including the brickwork—completing it with 33 carloads of refractories. The finished weight was 1850 tons. It was moved 900 feet into the shop in 78 minutes.

No. 6 was out of production only 11 days. If rebuilt under conventional methods, the furnace would have been down from three to four weeks.

To make the move into the shop as simple as possible, the furnace was built on six ingot mold cars mounted on three sets of track. Roller assemblies were installed on an erection platform so that the unit could be rolled into place when it reached location in the shop.

Problems Avoided

Other obstacles were avoided by pre-planning. As brickwork began, special heating units were placed in the furnace to protect refractories from freezing weather. In the moving operation, a locomotive was equipped with special rheostat push button controls which assured smooth movement at extremely low speed.

Fabrication and erection of the steelwork was handled by U. S. Steel's American Bridge Div. Consolidated Western Steel Div. acted as subcontractor. Geneva's steelmaking capacity will be raised from 1.8 to 2.2 million tons.

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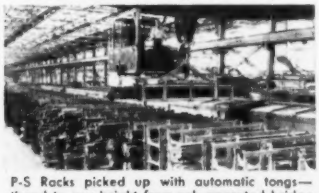
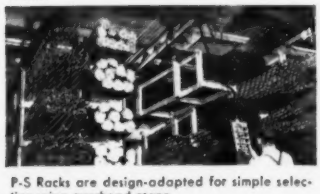
P-S Rack pick-up by PALMER-SHILE AUTOMATIC TONGS suspended from overhead crane.

Item No. C-497

P-S Racks have flush top and bottom, with full wrap around crane bars. In addition to the full wrap around crane bars, an extra thickness of lift bar is welded for strength and safety.



P-S Racks picked up with automatic tongs—tiered to any height from cab operated bridge crane.



P-S Racks are design-adapted for simple selection using overhead crane.

Why do it the OLD WAY? . . . an investment in ultra-modern Palmer-Shile portable heavy duty bar racks will pay off many times over by eliminating inefficient, money-wasting stock handling and storage methods.

Besides making it so simple, so convenient and safe to tier and store all kinds of bar, sheet, pipe, tubing and other stock, P-S racks also act to prevent damage to stock from the time it arrives at your plant through every handling and storage step.

Flush bottom insures sturdy, rigid, safe tiering—rack upon rack. Heavy gauge steel safety stacking pockets on rack corners eliminate danger of rack slipping or falling. Double thickness lifting lugs welded to wrap around channels, for maximum strength and safety.

Engineered-built to your size and weight specifications. Let our engineers explain how P-S racks add to the efficiency and economy of your manufacturing operations.

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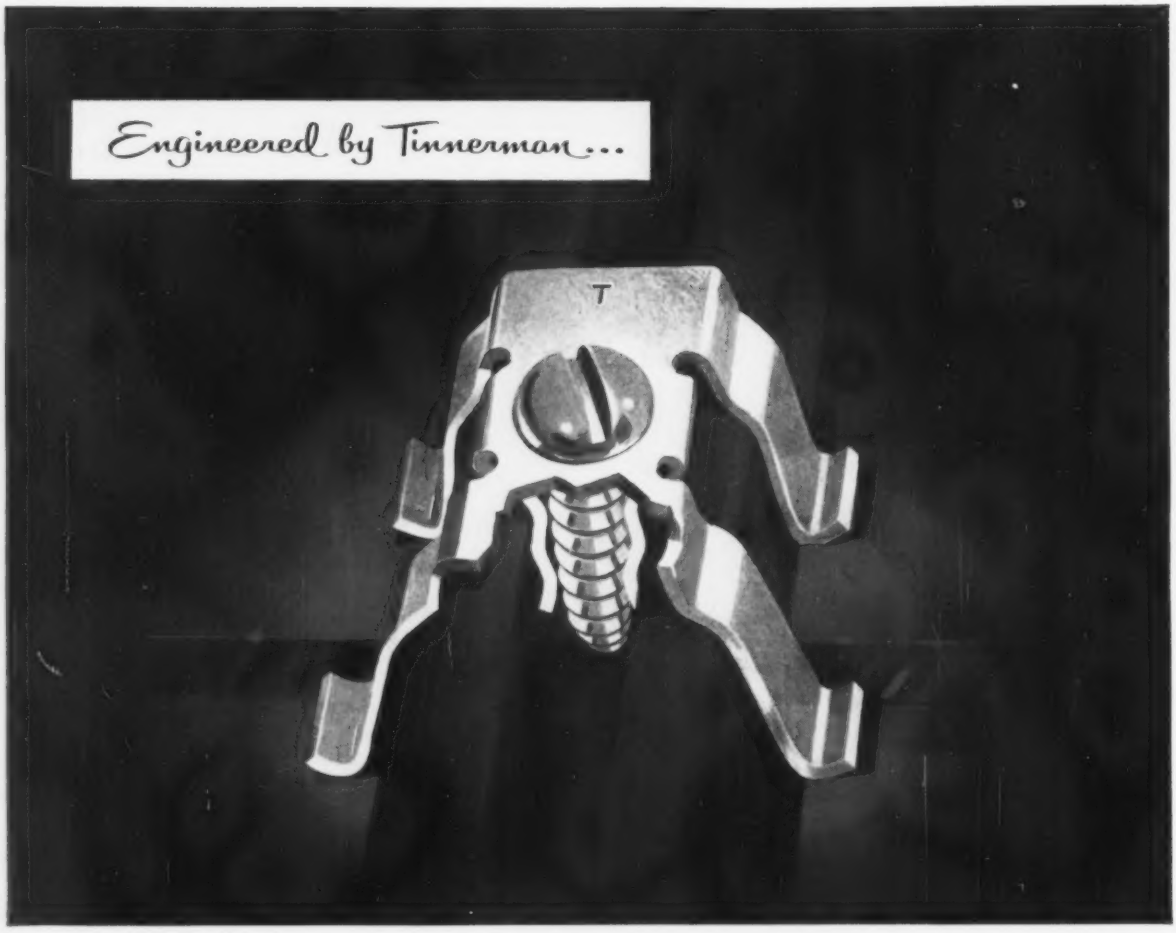

6-fingered **SPEED CLIP**®
holds glass panels tight, saves 46%!

This special SPEED CLIP fastens glass panels to aluminum extrusions with a grip that prevents slippage. Heat stays in, rain stays out of greenhouses and similar glass structures. Working closely with engineers of the Metropolitan Greenhouse Mfg. Corp., Brooklyn, Tinnerman developed this unique fastener that saves almost one-half the cost of former less effective assembly methods!

Installation is fast and simple. Two overlapping glass panels are positioned against the extrusion. A screw driven into the spring-steel SPEED CLIP spreads the two center fingers outward to grip the inner walls of the extrusion. No secondary fastening devices required—SPEED CLIPS hold tight, yet are easily removed to permit replacement of glass.

This is another example of a fastener engineered by Tinnerman to satisfy special, complicated fastening problems. A Fastening Analysis of your products may produce a similar cost-cutting solution. See your Tinnerman representative soon.

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Speed Nuts®

FASTEST THING IN FASTENINGS®

Canada: Dominion Fastoners, Limited, Hamilton, Ontario. Great Britain: Simmonds Aerocessories, Limited, Treforest, Wales. France: Simmonds, S. A., 3 rue Salomon de Rothschild, Suresnes (Seine). Germany: Hans Sichinger GmbH "MECANO", Lemgo-I-Lippe.

REPORT TO MANAGEMENT

Is Something Stirring In The Farm Belt?

Help occasionally comes from the most unexpected sources. That may be the case this year when so many businessmen are worried about business prospects.

For the past two years, it's been freely predicted that the farm market was about to snap back from its persistent doldrums. Just as regularly, farm income has refused to bounce back. As a result, farm implement companies and others dependent on the farmer have had more than their share of hard knocks.

This was particularly painful in view of the unparalleled prosperity that other segments of business enjoyed. Cutbacks and low earnings became the rule.

It's doubtful, barring a serious change in world conditions, that boom times are in the cards for the farm markets. But there are some signs that better things are ahead.

It's The First Improvement Since 1951

There was a slight increase in farm income in 1956. It's true that it was very slight. But what is significant is that it was the first improvement since 1951.

Even more encouraging are the reports from farm equipment makers on January sales. The slight upturn of about 5 to 10 pct represents the first upturn in sales in well over a year.

Everything is relative, and this is no exception. The modest increases, even if they continue through the year, in many cases will mean just cutting down on losses sustained last year. In others, the encouraging signs may mean an opportunity to edge into the black after a period of steady losses.

Reasons for the modest optimism are found in the complex economic maze the farmer finds himself in these days. Improved farm income is expected to come from an increased demand for goods coupled with a reduced output of agricultural products.

Part of this demand is expected to come from the continued high level of income throughout the country. This will strengthen the domestic market. Exports are also expected to be stronger.

The soil bank, after its highly publicized introduction, may also start paying off. It's expected that 40 to 45 million acres of farm land may go into the soil bank this year. This is one-ninth of total acreage planted. Government payments may almost reach the $1.2 billion authorized for the soil bank.

Long Term Contracts In Full Force

Unless you're involved with one of the more unpredictable labor unions, you're probably looking forward to a year of labor peace—and raises—by virtue of a long-term contract.

The full scope of the long-term pact has broadened to an extent probably not dreamed of a few years ago. This year wage increases under long-term contracts will be granted to about five million workers in more than 550 major industries. Some three million workers are covered by agreements negotiated in 1956, others previously.

About 90 pct of the increases fall between five but less than 11 cents per hour. About 2.5 million workers are in the six and seven cents per hour group. Some 750,000 workers will get nine cents. Somewhat fewer will get five cents, about the same number a full 10 cents.

Something else to remember is that the vast majority of this group will be covered by escalator clauses, under which wages rise or fall with the cost of living.

INDUSTRIAL BRIEFS

Wide Market . . . Kaiser Engineers Div. of Henry J. Kaiser Co. has signed a world-wide agreement with The Steel Co. of Wales Ltd. to manufacture and promote the sales of the P. T. Oxygen Gun for openhearth steelmaking applications. Agreement includes the rights to make, use, sell and sublicense the patented equipment to others throughout the world with the exception of Europe.

Caustic Remark . . . Dow Chemical Co. has begun construction of terminal facilities at Baltimore, Md., for storage and distribution of 50% caustic soda solution. The terminal is expected to be in operation in early April. The company's two leased tankers, the Marine Dow-Chem and the Marine Chemist, will supply caustic soda to the terminal from the Dow Texas Division.

Fitting And Proper . . . General Fittings Co. has purchased the Hayden Heater Co. of Easton, Md. Hayden's manufacturing facilities have been moved to East Greenwich, Conn., where they will continue as the Hayden Heater Div. of General Fittings Co. The new division will produce electric heating elements for pre-heaters, deicers, ovens, furnaces, and other units used to heat water, oil, air, or chemicals in a wide variety of industries.

Smashing Atom Costs . . . The Quality Control Dept. at the Eddystone Div. of Baldwin-Lima-Hamilton Corp. has devised a low-cost do-it-yourself storage vault for radioactive Cobalt-60. Two vaults were made at Eddystone at a total cost of less than $200. They substitute for equipment which costs as much as $2700, and have been approved by the Atomic Energy Commission as safe storage containers for Cobalt-60 sources up to 1-curie in strength.

Take Back Your Mink . . . Gulton Industries of Metuchen, N. J., and The Lithium Corp. of America, Minneapolis, have a development contract for extensive research in protective industrial coatings. Research will be done in the fields of porcelain enamel coatings for light architectural metals, and in high-temperature ceramic coatings for aircraft and guided missile structural materials.

Speedy Move . . . Hallidie Machinery Co., Seattle, Wash., industrial distributors, has been appointed by Speed-D-Burr Corp., Glendale, California manufactures of precision barrel finishing equipment, as technical sales and service representative for the states of Washington, Oregon, Idaho, Montana and the Territory of Alaska.

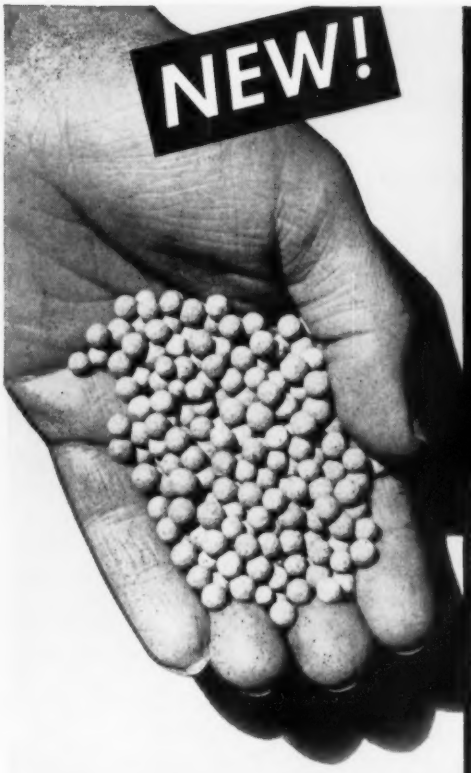
Jackpot, Before Taxes . . . Merrill G. Leonard and Arthur M. Lockie, engineers at the Westinghouse Electric Corp.'s Transformer Div. shared an award of $7000. The award is for recognition for their joint efforts in the invention of a circuit breaker for distribution transformers.

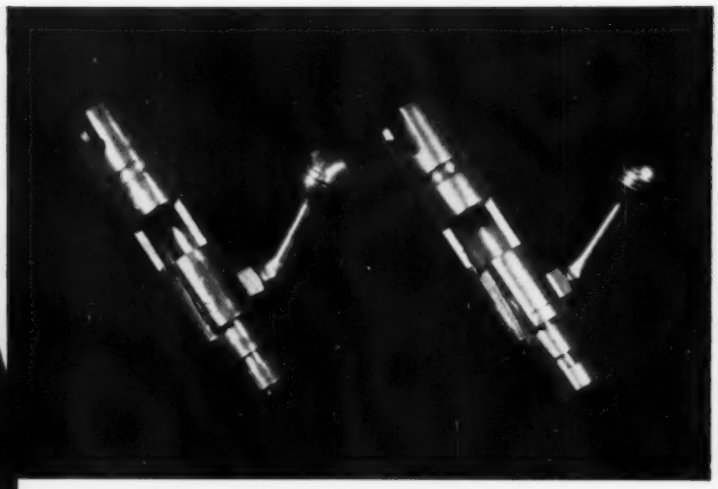
Make Mine 6066 . . . Military specifications for alloy 6066 developed by Harvey Aluminum. Torrance, Calif., is now available for general distribution. This specification MIL-A-24593 (USAF), covers aluminum alloy bars, rods, and shapes produced by extruding. Alloy 6066 is recommended for applications requiring high strength combined with corrosion resistance.

Summer School . . . The Computation Laboratory of Wayne State University is offering its fifth special summer program of three weekly courses. First Course: June 3-8 is Introduction to Computers and Their Applications. Second Course: June 10-15 is Data Processing in Business and Industry. Third Course: Sept. 9-14 is Industrial and Management Computer Applications. A conference on Matrix Computations will be held Sept. 3-6, 1957.

Any Takers? . . . A closing date of March 25, 1957 has been set for entries in the fifth annual Clark Equipment Co. Award contest. The contest is open to members of the American Materials Handling Society and college students studying materials handling. Two thousand dollars total prize money will be awarded the five best papers on the subject "Outdoor Material Handling and Storage."

Exhibit Example Extrusions . . . Numerous applications of hot extruded-cold-drawn bars in the manufacture of airframe, aircraft engine and guided missile components will be featured in the exhibit of Jones & Laughlin Steel Corp. at the Western Metal Exposition, March 25-29, at Los Angeles. The exhibit shows a variety of sections that have been hot extruded and cold drawn—a process that eliminates in most cases the need for further milling and machining.





The new ALUNDUM Tumblex "S" abrasive rolls around and through intricate parts; brings high uniformity of radii and surfaces, with smooth finish, to the barrel-finishing of parts as intricate as this gun component. The "before and after" view shows you how the spheres improve external and *internal* areas.

Besides this 3/16" diameter size of Tumblex "S" you can order it in four other sizes, up to 7/8". This means top barrel-finishing performance for you, in many different applications. And these new spheres are exceptionally dense and long-lasting.

Another big advance in barrel-finishing

Norton Tumblex "S" abrasive spheres

From the pioneer of ALUNDUM bonded triangles — now, new bonded spheres to help you do a better job*

If you finish parts that have hard-to-contact recesses or intricate shapes, Tumblex "S" tumbling abrasive is the latest development.

Here are the reasons why tubing, coil springs, scissor handles, bearing retainers, pump bodies and many other parts benefit by the new shapes and sizes of Tumblex "S" — and its top-quality as a tumbling abrasive.

- *Tumblex "S" is made in spheres that easily get into areas where other abrasive shapes can't reach.*
- *Made of famous Norton ALUNDUM abrasive, it cuts fast — resulting in shorter time cycles and lower costs per piece finished.*

5 Different Diameter Sizes

#2—7/8"	#4—3/8"
#3—5/8"	#5—9/32"
#6—3/16"	

Send Your Work Samples

Let us demonstrate in our newly enlarged Sample Processing Department how Tumblex "S" Abrasive can give the value-adding "Touch of Gold" to your product quality and cut your barrel-finishing time and costs. NORTON COMPANY, Worcester 6, Mass. Distributors in all industrial areas, listed under "Grinding Wheels" in your phone book, yellow pages. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Massachusetts.

G-321

*Trade Mark Reg. U. S. Pat. Off. and Foreign Countries

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NORTON PRODUCTS:
Abrasives • Grinding Wheels
Grinding Machines • Refractories
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Sharpening Stones • Behr-cat Tapes

Chrysler Makes Turbine Engine Headway

The company is doubling its laboratory space for research . . . Adds to its research staff . . . May be a tipoff that actual production of a turbine engine for passenger cars is drawing nearer—*By T. L. Carry.*

◆ IS CHRYSLER CORP. closer to a production gas turbine engine than most people realize?

It's possible that this is so. The company announces that it is doubling laboratory space for research on both the gas turbine and piston engines. In addition, Chrysler is increasing its research staff by 20 pct.

For the last year speculation on the gas turbine for passenger cars has been relatively quiet. This is due mostly to the development of a free piston engine by General Motors Corp. Among the Big Three, both Ford and GM have been experimenting with free piston engines. Chrysler, however, has stuck to its guns and concentrated on the gas turbine.

Coast to Coast Run . . . It is believed by some authorities that the turbine engine is best suited for truck designs. Ford and General Motors are in a race to get the first gas turbine truck on the market. But in the passenger car field, these two are concentrating on the free-piston engine.

Chrysler first announced the development of a gas turbine in 1954. It was installed in a Plymouth and was the first to solve the problems of exhaust heat and high fuel consumption due to the development of a heat exchanger.

After further research and testing, a 1956 Plymouth, equipped with a gas turbine, made a coast to coast run last spring.

Obstacles Remain . . . It is thought here that the announcement of further expansion of the research program is a tipoff that the Corporation is coming closer to actual production of a turbine engine.

Chrysler does not deny that there are still many problems connected with the engine. One of the main bottlenecks is the search for materials that can withstand high temperatures and at the same time be produced cheaply.

At the same time, Chrysler is not neglecting the regular piston engine. Neither is the rest of the industry.

The reciprocating engine is still the best powerplant available for an automobile.

Hunt Lighter Metals . . . Powerplant engineers can prove that the present engine is both economical and efficient. At the same time, they claim that there is still plenty of room for improvement.

The advent of fuel injection is one improvement that was introduced this year. In addition, the search for lighter metals in the engine itself will eventually make it possible to increase performance.

Less weight automatically increases power. Improvement in overall efficiency and economy of

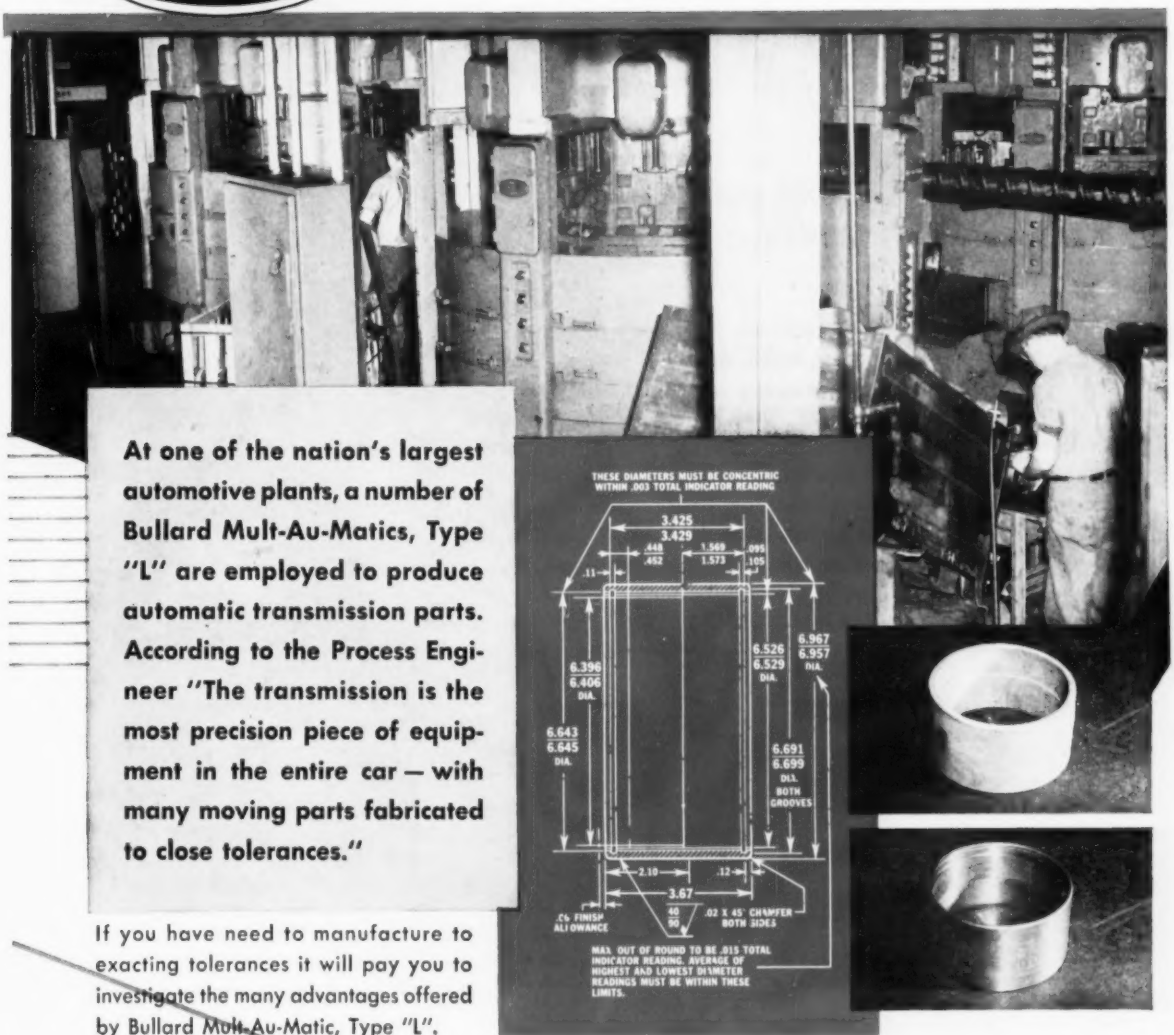
Precision Fixtures Speed Production

AN INSPECTOR checks a door panel mounted on a precision fixture at Fisher Body Div. plant in Detroit. The fixture, equipped with gages, measures critical control points and checks shape and contour within fine limits.

Automobile Manufacturer produces

Repetitive Pieces to Close Tolerances with

BULLARD MULT-AU-MATIC Type "L"



At one of the nation's largest automotive plants, a number of Bullard Mult-Au-Matics, Type "L" are employed to produce automatic transmission parts. According to the Process Engineer "The transmission is the most precision piece of equipment in the entire car — with many moving parts fabricated to close tolerances."

If you have need to manufacture to exacting tolerances it will pay you to investigate the many advantages offered by Bullard Mult-Au-Matic, Type "L".

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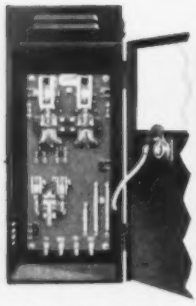
Get more work from *any* magnet

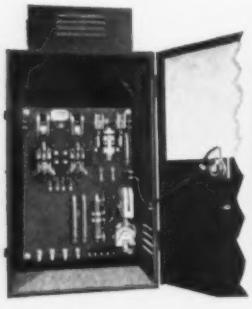
with EC&M MAGNET CONTROLLERS

ADJUSTABLE...for Faster, cleaner release of loads

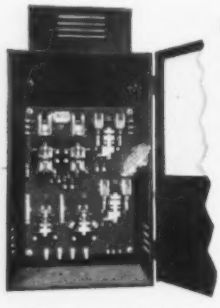
EC&M Magnet Controllers deliver top performance with magnets of all types and makes. They discharge loads quickly and cleanly. There is no "dribble." Magnets "work" more because faster drops eliminate "positioning" the magnet at point of discharge... A simple, two-position (Lift-Drop) Master Switch provides exceptionally easy operation. Because power is off, automatically, when the switch is in the "drop" position, there is no overheating to reduce high lifting capacity. Longer magnet life is another important bonus.



Type AD Standard Controller for single magnets or two magnets in parallel. Exclusive, adjustable discharge for different type loads



Booster Controller gives increased pull-away power from pile, then carries load at reduced current



High Speed Release DLM-335-A Controller reduces the discharge time of deep-type magnets 50%

***Bulletin 905** gives complete description of EC&M Controllers for use on lifting magnets of all types and makes*

***Write** for your copy*

THE ELECTRIC CONTROLLER & MFG. CO.

A DIVISION OF THE SQUARE D COMPANY

CLEVELAND 28 • OHIO

8017

Automotive Production

WEEK ENDING	Cars	Trucks
Feb. 16, 1957	148,484	23,306
Feb. 9, 1957	147,163	22,957
Feb. 18, 1956	128,320	23,227
Feb. 11, 1956	136,308	24,659
TO DATE 1957	965,269	146,054
TO DATE 1956	960,809	169,444

*Estimated. Source: *Ward's Reports*

the engine would be another result.

Regardless of just where Chrysler is in its present gas turbine program, the reciprocating engine will remain a formidable contender in the automotive field.

This will be so for many years to come. First, because early production models of a gas turbine are going to be costly. Secondly, the ordinary motorist will probably be satisfied with the gas turbine when he compares the cost with the performance of the piston engine.

Climbing Costs:

Industry absorbs some, passes others on.

How much have higher prices affected the sale of cars so far this year? Probably not as much as you might think.

The reason most often cited for the early lag of medium price cars is cost. In the early part of the 1957 run, this appeared to be so. But today sales of medium price cars are beginning to show slight improvement.

This merely proves that when most people want to buy a car, they are not as concerned with the original price as they are with what the monthly payments for it will be.

Steady Rise

The cost of automobiles has been going up steadily in recent years. This is due mainly to a combination of increases in both labor and raw material costs.

Although it is not generally known, the industry in many cases has absorbed some of these costs without increasing its own prices.

Take, for example, the year 1955. At that time, the industry negotiated new contracts with the United Autoworkers and also had to pay more for steel and other materials.

Both of these things happened close to the middle of the model year but nobody raised prices until the 1956 models were introduced.

More Coming

Last year, the price of steel went up again in August. Admittedly, this was near the end of the model run and not too many cars were being produced. But the fact still is that for the remainder of the run, nobody increased prices. Meanwhile, automakers have been absorbing increased extra costs.

Chrysler Comes Back

Chrysler Corp. is evidently recovering rapidly from the effects of a bad year in 1956.

Earnings up to the end of the third quarter last year were just slightly over $6 million. The complete annual report shows that net earnings last year totalled $19,952,969.

The bulk of the money was made in the fourth quarter with the introduction of the 1957 line. Total earnings for that period were over $13 million. Indications are that they would have been even higher if Chrysler had been able to get production rolling at a competitive rate early in the season.

The financial results of 1956, according to L. L. Colbert, Chrysler president, were affected not only by a lower demand for cars but also by other factors.

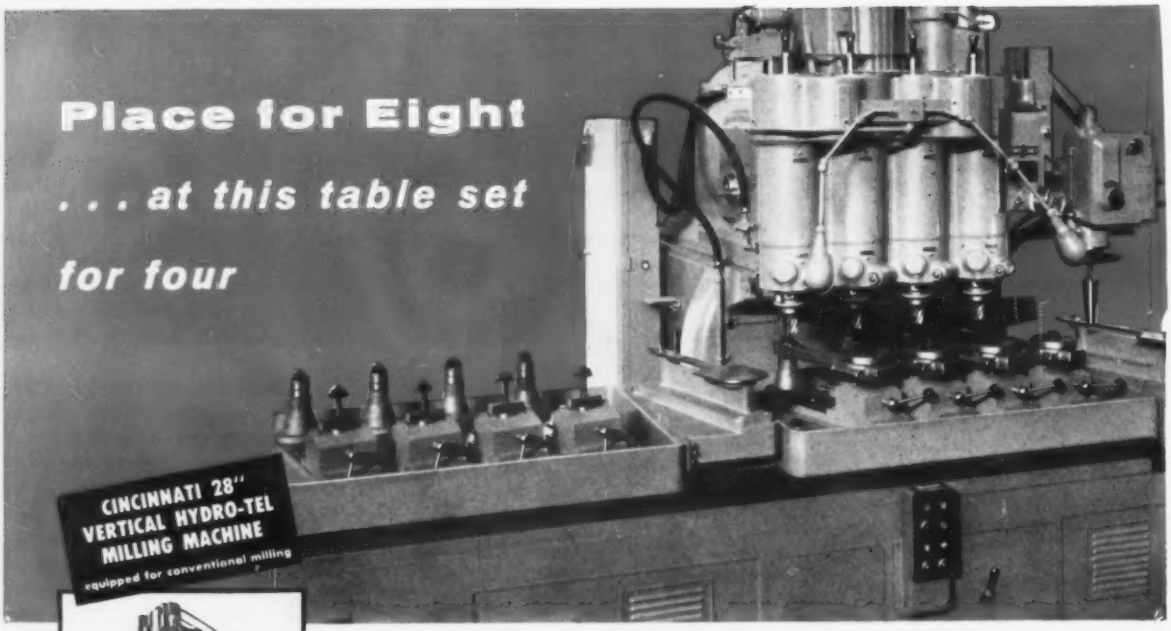
Mr. Colbert says that design and development of the 1957 line required extensive rearrangement of plant facilities which led to extra heavy cash outlays.

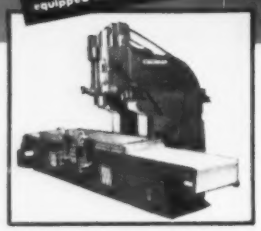
In addition, to meet the introduction dates of competitors, the time for developing the cars was shortened several months. The result was a crash program which is always an expensive item.

Mr. Colbert is optimistic about the outlook for Chrysler's cars this year. The success so far indicates that the profit picture will be much better.

THE BULL OF THE WOODS — **By J. R. Williams**

TH' BULL O' TH' WOODS DON'T LIKE ANYBODY SITTIN' ON HIS DESK BUT TH' TALLER GUYS CAN OOZE ON WITHOUT BEIN NOTICED MUCH! BUT A GUY WHO HAS TO WRIGGLE UP AN' MAKES A BIG PRODUCTION OF IT IS OUT OF LUCK!
YEH, AN' DRAWS MORE ATTENTION THAN A ROCK AN' ROLL DANCE IN A CHURCH! AN' IF HE'S HUMAN, HE'S SOON AGIN IT JUST AS BAD AS TH' BULL O' TH' WOODS!
THE BYSTANDER
J.R.WILLIAMS 2-20
© 1957 by NEA Service, Inc. T.M. Reg. U.S. Pat. Off.





It's an established principle for methods engineers in the "know"... while one or a group of parts is feeding past the cutters, a second fixture mounted on the machine is reloaded for its turn at the feeding station. In many cases handling time chargeable to cost is practically nil. ¶Advantages of this principle are very much worth while for the milling operation illustrated here. A CINCINNATI® 28" Vertical Hydro-Tel, with 96" table traverse, is equipped with duplicate fixtures and a four-spindle head to automatically profile mill four connecting rods at one time. Surfaces milled are indicated in the drawing. This Hydro-Tel is equipped for 360° automatic profile milling, one of the seven ways in which Hydro-Tel machines are built for various types of work. The complete list includes:

1) **Conventional milling, low series spindle speeds**
2) **Conventional milling, high series spindle speeds**
3) **Die sinking**
4) **360 degree automatic profiling, non-selective**
5) **Die sinking and 360 degree automatic profiling, non-selective**
6) **360 degree automatic profiling, selective**
7) **Die sinking and 360 degree automatic profiling, selective**

Drawing of part. Surface outlined is automatically profile milled in one continuous cut.

28" Vertical Hydro-Tels have plenty of range for large work; 60", 96" or 120" table traverse; single spindle head or 2, 3 or 4 spindles. May we give you more information? Write for catalog M-1773-2. For brief specifications look in Sweet's Machine Tool File.

THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO

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MILLING MACHINES • BROACHING MACHINES • CUTTER AND TOOL GRINDERS • METAL FORMING MACHINES
HARDENING MACHINES • OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID • GRINDING WHEELS

Defense Attacks Entrenched Supply Items

Inventory shows more than 3 million items in supply systems of military services . . . Next step is standardization . . . But experience shows services hate to yield an inch—*By G. H. Baker.*

◆ THE DEFENSE DEPT. finally finished counting the number of items in its supply systems. The answer: 3,128,613 different items.

The inventory took almost 11 years. It is the sum of all items carried in all the different supply catalogs used by the Army, Navy, Air Force, and U.S. Marine Corps. The combined services of 6,000 government employees were required to take the inventory.

Having counted up the types, the Pentagon's next job is to reduce this huge total. Standardization is the key to this problem. But military procurement officials won't even hazard a guess as to how for the 3.1 million total can be cut.

Tough Job To Come . . . After that, the Pentagon will assign single stock numbers to the remaining items. Then—the toughest job of all—is to get Army, Navy, and Air Force supply officers to use the catalog.

In the past, each of the military services has jealously insisted on its own specifications—even for common commercial items like notebooks.

The catalogs will only be used as doorstops in thousands of military supply offices if somebody in a high position doesn't insist that all Army, Navy, and Air Force supply officers use them.

Use of a common supply catalog by all Army, Navy, and Air Force purchasing offices has been urged for years by the Hoover Commission (on government efficiency) and by congressional committees looking into wasteful military practices. The military was reluctant, however, to adopt a common system. The Pentagon's many small supply "empires" each wanted to continue procurement in their own way without regard to the savings inherent in a common system.

Help Older Workers

Legislation to force employers to use older workers, especially scientific and technical experts, is a possibility this year.

Congress is considering a measure sponsored by four Republicans to "prohibit unjust discrimination" because of age. The measure will probably have bi-partisan support.

The bill would make it illegal to fire, refuse to hire, or otherwise discriminate against an individual because of age "when the reasonable demands of the position do not require such an age distinction." It would also make it illegal to use hiring services which discriminate because of age.

Provisions of the bill, if passed, would be enforced by the Wage and Hour Div. of the U.S. Labor Department.

"Hiring bias generally against workers 45 and older deprives the nation of its most important resource of experienced employees, adds to the number of persons receiving public assistance, and deprives older people of the dignity and status of self support," the sponsors say.

The White House commission seeking methods of relieving shortages of skilled persons also recommends employment over 65 when possible.

The bill, S. 1073, is sponsored by Sens. Jacob Javits, N.Y.; Irving Ives, N.Y.; Frederick Payne, Me., and Thruston Morton, Ky.

Is That Midwinter Sun Tan Deductible?

Is "reconditioning" of executives on Florida beaches a tax-deductible expense?

The Internal Revenue Service has been asked by a U. S. Senator to say yes or no—and if so, why?

Curiosity of Sen. Murray, D., Mont., who posed the question, was aroused by a magazine advertisement for a Miami Beach hotel. It claimed that "reconditioning" of executives in the Florida sunshine is deductible for tax purposes.

If this is true, what is the authority for such deductions, Sen. Murray wants to know.

And just who qualifies as "an executive"?

The answers could have a sizable effect on the resort trade—and possibly on some "executive" plans for February and March.

Twice the life of previous heating elements!

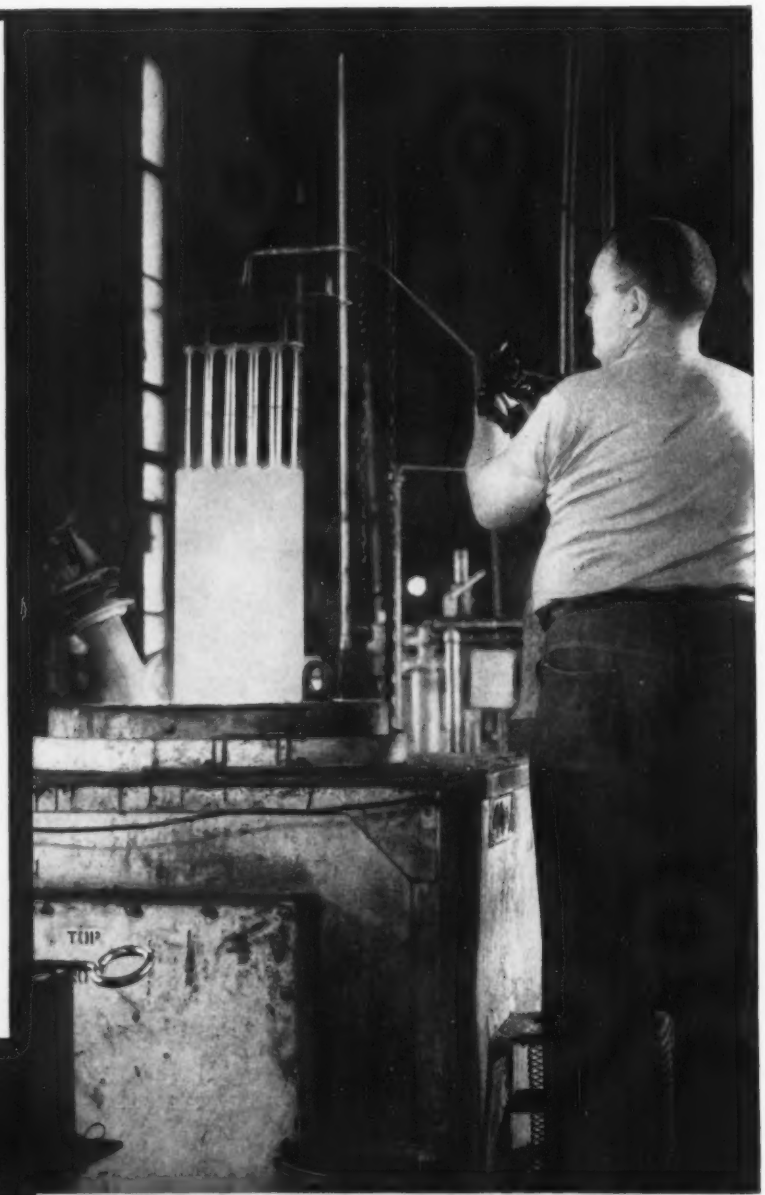
...a report on "HOT RODS" in intermittent service

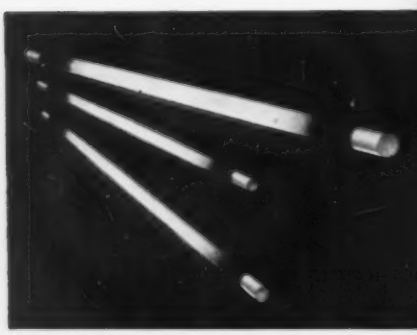
Many plants report Norton "Hot Rods" outlast other non-metallic elements by a considerable margin. Here's a case where they're lasting twice as long — in gruelling intermittent service.

This means big savings in element costs alone. You also save maintenance expense, due to less frequent changing of elements and voltage taps. And you don't have to shut down the furnace to replace elements.

Also, "Hot Rods" heat more uniformly, due to their slow, evenly matched rate of resistance increase. This helps protect product quality and maintain a smooth production flow.

The booklet, "*Norton Heating Elements*," tells you more about how "Hot Rods" can help improve your furnace operations and cut costs. Write for your copy to NORTON COMPANY, Refractories Division, 201 New Bond Street, Worcester 6, Massachusetts.





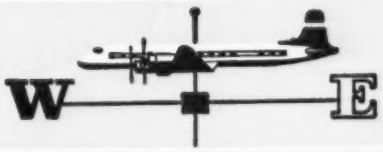
After Hardening At 2200°F, white-hot hacksaw blades are lifted from a Lindberg hydrizing furnace in the plant of *G. W. Griffin Co.*, Franklin, N. H. — a well-known manufacturer of hacksaws. Norton CRYSTOLON* heating elements ("Hot Rods") are located in air outside the crucible which contains the protective atmosphere. Heating cycles are intermittent, the furnace being shut down each night. The "Hot Rods" in this installation have averaged twice the service life of the elements used previously.

CRYSTOLON Heating Elements, or "Hot Rods", are a typical Norton Rx — an expertly engineered refractory prescription for greater efficiency and economy in electric furnace and kiln operation. Made of self-bonded silicon carbide, each rod has a central hot zone and cold ends. Aluminum-sprayed tips and metal-impregnated ends minimize resistance and power loss. Available in standard sizes and interchangeable with your present rods.

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

NORTON
REFRACTORIES
Engineered... Rx ...Prescribed

Making better products... to make your products better



WEST COAST REPORT

Here's Seller's Guide to the Farwest

Area's new plants and expanding ones are good prospects to buy metalworking's materials, products and services . . . Here's latest rundown on new firms and those enlarging facilities—By *R. R. Kay*

◆ THERE'S NO LETUP in the number of new or expanding plants in this area. In California alone, last year's investment in new plants and enlargements was over $1 billion. And it's the same story up and down the Coast.

Here's a rundown on the newcomers and the plants expanding —all good prospects for metalworking's materials.

Schmitt Steel Co., Portland, Ore., is enlarging its aluminum and steel forging facilities. Trent Tube Co., subsidiary of Crucible Steel Co. of America, expects to open a new Los Angeles plant by mid-year to make welded stainless steel and high alloy tubing.

Millions for Cleansing . . . A multi-million-dollar coal cleaning plant will go up on the Utah coal properties of Columbia-Geneva Steel Div. of U. S. Steel. The 600-ton-per-hour plant will lead to higher coke yields and improved blast furnace operations at the Geneva Works near Provo, Utah.

Work is underway at Santa Ana, Calif., on a $5 million plant for Standard Pressed Steel Co., Jenkintown, Pa. By early next year the 280,000-sq-ft factory should be turning out industrial and aircraft fasteners and pressed steel shop equipment.

"Open For Business" signs are now out on these Portland, Ore., doors: B & T Bimatics, screw machine products; Research Instrument Co., electronic instruments; Bor-A-Car, automotive engine rebuilders.

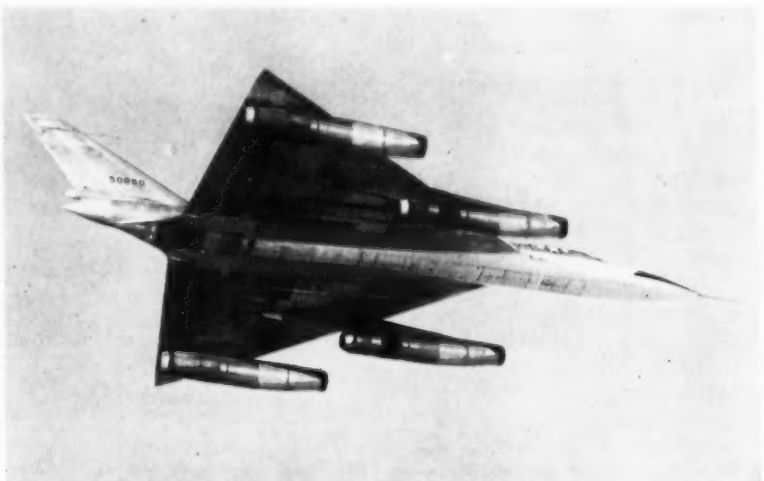
And in the South . . . In San Diego, these firms are getting started or enlarging facilities: Cal Fab, Inc., sheet metal fabricators; Kay Lab, industrial TV sets; Nacimco, instruments makers; National Plating & Processing, metal finishers; Narmco, Inc., synthetic structural materials; San Diego Steel Rule Die Co.; Swanson Mfg. Co., earth moving tools.

By the Golden Gate . . . Around the San Francisco Bay Area, there's growth at: Friden Calculating Machine Co., San Leandro; Mechano-Electro Works, Oakland tool and die maker; United Engine & Machine Co., maker of aluminum pistons, and National Cylinder Gas Co., both of San Leandro; L & B Manufacturers, Berkeley producer of automatic welding jigs and fixtures.

A $2.5 million brass mill for Titan Metal Manufacturing Co. is in the works at Newark, Calif.

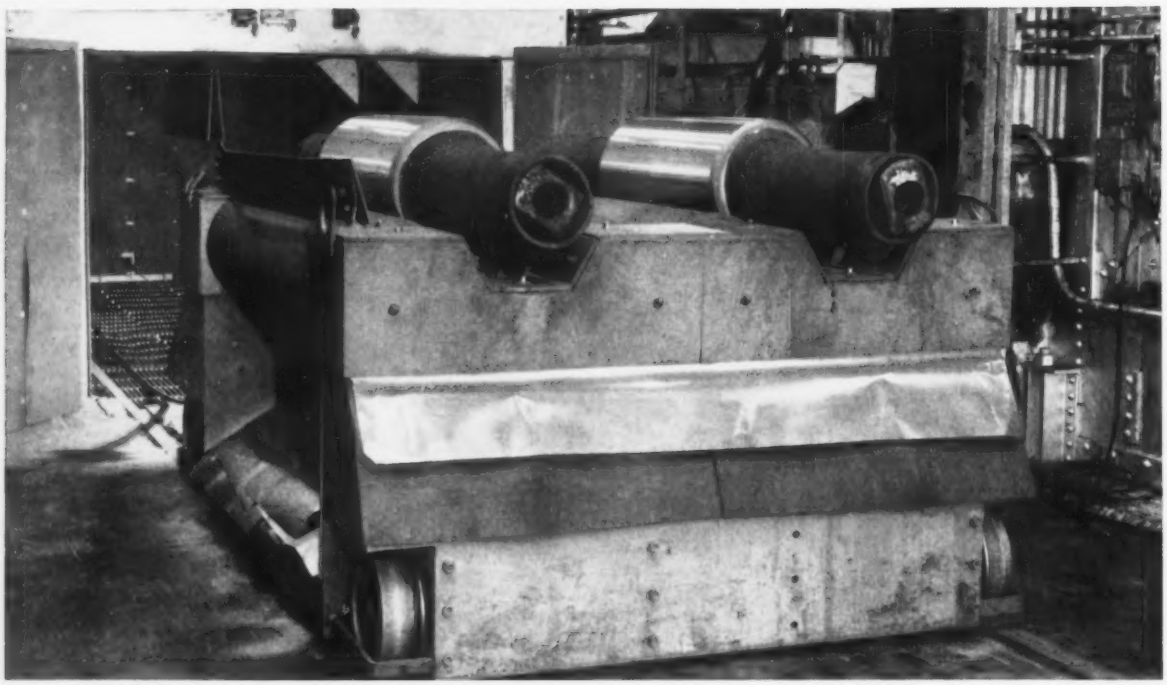
Busy Elsewhere . . . Southern California has plenty of activity, too. Kaynar Mfg. Co., Inc., is finishing up a $2 million plant at Rivera for manufacture of self-locking nuts and pin curl clips. Parker Aircraft Co., Los Angeles, is expanding its plant for hydraulic and fluid system components. Wayne Vaughan & Co., Inc., will make movable interior walls in Los Angeles. H. R. Noll Co. has opened a machine shop in Montrose.

Other Los Angeles-Area expansions include: Art Metal Mfg. Co., Pomona, maker of playground equipment; Airborne Research & Development Corp., Sun Valley, producer of low temperature valving; Coast Air Supply Co., Burbank, manufacturer of electronic components; Sugden Engineering Co., maker of furnace pipe.



SUPERSONIC BOMBER—the pencil-thin, delta-wing Convair B-58 Hustler—uses four powerful J-79 turbojet engines to fly faster than sound and to stratospheric heights. It's undergoing test at Fort Worth, Texas.

Which advantage is most important to you?



You get them all in WHEELABRATOR® mechanical mill roll etching

? Uniform etch

? Longer roll life

? Better product finish

? Time savings

? Cost reductions

The mechanical and automatic nature of Wheelabrator mill roll etching brings you all of these advantages. For instance, it eliminates the opportunity for human error. Once calibrated, it automatically produces a uniform etch, with optimum penetration, roll after roll. This also means longer roll life — as much as 30% more service life. There are no areas of shallow etch to cause too-frequent dressing and no areas of too-deep etch to cause waste of roll surface in successive etchings. This uniformity also provides more uniform surface finishes on the final product.

Variety in type and size of abrasive, velocity and volume of abrasive, speed of work travel and rotation and other variables are easily adjusted to provide close control of the surface etch. This means a single machine can produce a wide variety of finishes, each meeting a precise surface roughness specification. Time and cost savings come from speed of etching, recently improved by a work car that carries two rolls at once. This not only saves etching time but also reduces mill delay. In addition, changeover for different finishes is faster and re-roll tonnage is reduced because a flatter strip is produced under increased screwdown pressures.

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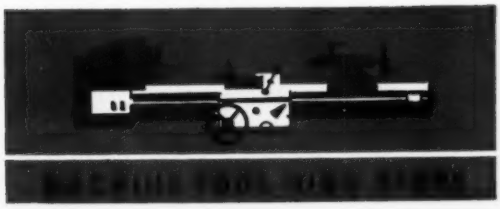
WRITE FOR details on the many new improvements in the Wheelabrator method of etching.



Machine Tool Pessimists Are Scarce

Cleveland builders are encouraged by 1957 outlook . . . One big factor is the number of small plants in the market . . . Planned replacement begins to take hold, with good sales results—*By E. J. Egan, Jr.*

◆ AT LEAST TWO Cleveland machine tool builders are quite optimistic about their 1957 business prospects.

"We do not go along with some predictions we have heard that business will be off 6 to 8 pct this year," says Robert M. Myers, sales manager of the Motch & Merryweather Company's Machinery Mfg. Div.

Mr. Myers believes his firm will book more new orders this year than in 1956. And he thinks the same might will be true of the machine tool industry as a whole.

Shipment Outlook . . . Shipments in 1957 will be excellent, too, he feels. "But," he says, "this picture may be a little less bright than the new order outlook. Shipments over the months ahead will reflect the dip in new business that the industry experienced in the closing months of last year."

Getting back to the expected upturn in new business, where is it coming from? Surprisingly enough, of the flood of inquiries Motch & Merryweather is getting these days, only a minority bear the names of big automotive plants.

Small Firms Active . . . Most of them are coming from smaller metalworking firms in every section of the country. And they want quotations for prompt delivery on all the machine types that make up M & M's diversified line.

According to Mr. Myers, this means two things. "First," he says, "it is a mistake to believe that smaller firms get nervous or shelve their plans every time they hear that the automobile industry is cutting back on production. These people are running their own businesses and they know what is best for them and what they have to do."

The second significant thing, he feels, is that all of the effort put into preaching the wisdom of planned replacement of obsolete machine tools is beginning to pay dividends. He is convinced that there is tremendous potential for all builders as more and more customers adopt and work at sensible replacement programs.

Others Agree . . . Echoing Mr. Myers' optimism is John Bradner, president of Cleveland's Lees-Bradner Co.

"New business in January and thus far in February has been excellent," he says. "Backlog for the firm's gear hobbing machines extends into the fourth quarter."

Here too, orders are not as heavily weighted on the side of the automobile companies as they have been in the past.

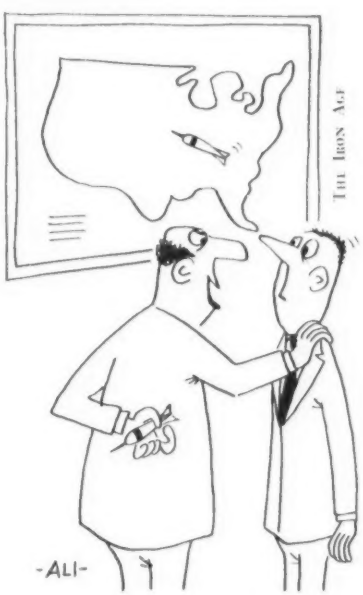
Mr. Braden has no doubts that machine tool users are definitely moving toward the philosophy that says they are already paying for a new machine tool the minute they start thinking about buying one.

"If you stop to think about it for a minute," he says, "what better investment is there than a new machine tool—when all the facts and figures indicate that the time is ripe to buy one?"

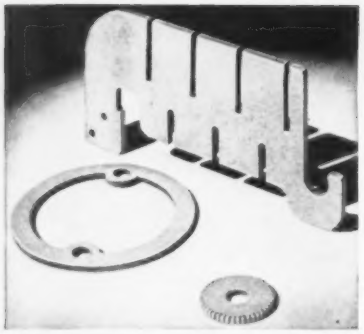
What other purchase will permit a business to do these three things: First, cut prices; second, raise wages; third, make more money for the firms' owners?

At first such a statement seems almost too neat, too pat. But it is not when you take a second look. It is just brief and very much to the point.

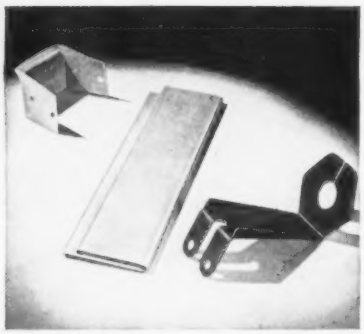
After all, no one buys a new machine tool unless he expects it to bring him at least a modest return on his investment. Often times it does far better than that. Every day, in fact, people learn to do more with machine tools than the builders ever dreamed of. And when that happens, it is very possible that the savings can be split three ways, into price reductions, wage increases and more money for the owners.



"After careful consideration we've decided to assign you to our Central Division."



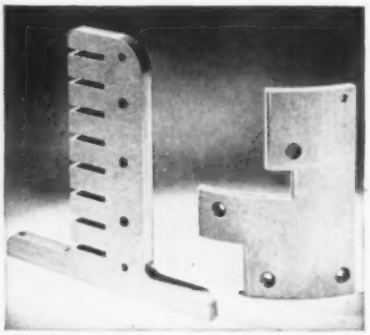
LEFT: Sheet stock; shear strips and punch. **TOP:** Sheet stock; shear strips, punch blank, gang-saw notches. **BOTTOM:** Sheet stock; shear strips, punch blank, mill notches.



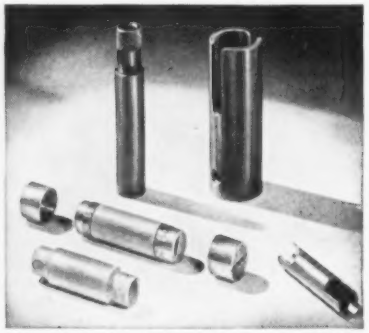
TOP LEFT: Sheet stock; shear strips, punch, form. **CENTER:** Sheet stock; shear to size, drill, form. **BOTTOM RIGHT:** Sheet stock; shear strips, punch pieces, form twice in mold, rubber-stamp twice.

LOWER LEFT: Hexagonal rod; smooth-saw, automatic screw machine, turn shoulder thread, chamfer, and cut off. The other samples are automatic-screw-machine parts made from Diamond Fibre by C-D-F.

LEFT: Sheet stock; sand, smooth-saw to size, smooth-saw bevel, smooth-saw corner cut-out, drill. **CENTER:** Sheet stock; band-saw, turn OD, bore ID, smooth-saw side, drill five blind holes with jig. **RIGHT:** Sheet stock; sand, band-saw, rough-bore ID, hob teeth, finish-bore ID, machine keyway.



LEFT: Sheet stock; sand, smooth-saw, drill, smooth-saw to shape, radius three corners, gang-saw notches. **RIGHT:** Sheet stock; band-saw rough blanks; form; smooth-saw width, length, and shape; radius edges; drill with jig; countersink.



LOWER LEFT: Tube stock; automatic screw machine, turn shoulders, chamfer and thread end, thread other end. **UPPER LEFT:** Tube (two diameters); smooth-saw, tap, screw-machine larger piece; screw-machine, thread, knurl, chamfer, cut off small piece. **UPPER RIGHT:** Tube; smooth-saw to length, punch twice, countersink. **LOWER RIGHT:** Tube; screw-machine, chamfer, cut off, punch.

C-D-F fabricates and forms DIAMOND VULCANIZED FIBRE

FAST . . . AT LOW COST . . . DEPENDABLY

Vulcanized Fibre is a wonderful material if you know where to use it and how to buy it. We suggest on many jobs that it's best to do the fabrication and forming in C-D-F's shops. Why? Because C-D-F knows how. Since 1895 the company has put fibre to work in everything from buggy axle bushings to metal clad radio parts. The handling of thousands of set-ups for high speed, low cost production runs gives C-D-F an "experience bank" to draw from. Shop supervisors have a wealth of short cuts, little tricks that result in lower prices for you. They know the material and its peculiarities.

TOUGH, RESILIENT, STRONG

How long has it been since you examined the unique properties and wide range of C-D-F fibre grades? Vulcanized Fibre is arc resistant, mechanically strong, non-corroding, half the weight of aluminum. Repeated moistening and drying in forming insignificantly alters the nature, structure or quality of the fibre.

Since C-D-F has their own paper mill, uniform, quality control is made possible. Special grades are more easily developed. A good example is C-D-F Abrasive Fibre, a medium density fibre with excellent resin and grit adhesion, now widely used for abrasive discs.

A BIG, RELIABLE SOURCE

C-D-F does business with the largest tonnage users of sheet, rod and tube fibre in the world. This means good deliveries, good prices, reliable products for every new customer. You deal with a materials engineer, a C-D-F man who knows how to give you the most value in Diamond Vulcanized Fibre. If you want to improve design, simplify purchasing, speed production, use Diamond Fibre and the facilities of C-D-F. Write for catalog, free test samples, or send us your print for quotation.

CDF

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The Iron Age

SALUTES

Victor F. Pastushin **President of Pastushin Aviation Corp., at 48 he is realizing a lifelong ambition. He started by chasing "bottleneck business" during World War II, proved that the U. S. still offers wide-open opportunity.**

To those who think opportunity is becoming an obsolete word, consider the example set by Victor F. Pastushin. He's a modern version of a Horatio Alger success story.

Eighteen years ago he was a $30-a-week bench hand at Douglas Aircraft Corp. in Los Angeles. Today, at 48, he is president of four companies; Pastushin Aviation Corp., Pastushin Industries, Inc., both of Los Angeles, Hawaiian Airmotive Ltd., and Aero Components, Puerto Rico.

Vic Pastushin's emergence from economic obscurity to a position of respect in the aircraft industry is a story of determination and ingenuity, of being in the right place at the right time, of sacrificing security for the big chance. His gamble is paying off.

In the late 1930's, Vic worked nights in his garage making aluminum die castings. By 1943, he had saved enough to open a little machine shop. He went in search of bottle-necks in the booming aircraft industry. He found plenty of them.

At one plant, he saw a handful of women workers laboriously filing burrs off stampings. Their work backlog covered half an acre. Vic went out and bought two rotary deburring machines from Sears-Roebuck and bid for the job. He got the contract and broke the bottleneck.

At that time there was sore need for hydropress equipment. So Vic asked his designer to draw up plans for a 7000-ton press. They built it in an open field in back of the shop. In the process, he ran into some bottlenecks of his own.

Since then, Vic Pastushin has become noted in the aircraft industry for his ability to create new forming machines. He is credited with developing bulge forming and high-speed welding techniques. To the cynics, he is proof that the "rags-to-riches" days are not gone forever. But it still takes imagination, shrewdness, and faith to make a dream come true.

...AND A LITTLE GOES A LONG WAY...

VANADIUM

NO OTHER ALLOY IS SO VERSATILE...

Vanadium was an early arrival in the field of alloyed iron and steel, yet there is nothing old-fashioned about it but the price. It is about the same as it was 30 years ago!

Today vanadium is recognized for its usefulness and versatility — for it is employed to promote strength, ductility, toughness, wear resistance. In tool steels as in other steels, vanadium is added to reduce and control grain size, and additionally to improve cutting capacity and maintain cutting edges — in large forgings it is used to supply transverse and radial ductility, while in deep drawing rimming steels vanadium prevents aging. There are uses, too, in the nonferrous field, and in the chemical industry it serves varied purposes in glass, ceramics, inks, coloring agents, synthetic textiles.

Vanadium is not only versatile, but also economical, for a little goes a long way — hence its unique popularity. Call your nearest VCA office to learn more about Vancoram Vanadium Products.

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Producers of alloys, metals and chemicals

in the home everybody benefits from

STAINLESS STEEL

THE ARCHITECT designs Stainless Steel into windows, kitchens, work surfaces, ovens and other important places because he knows there is nothing like Stainless for clean, lasting beauty.

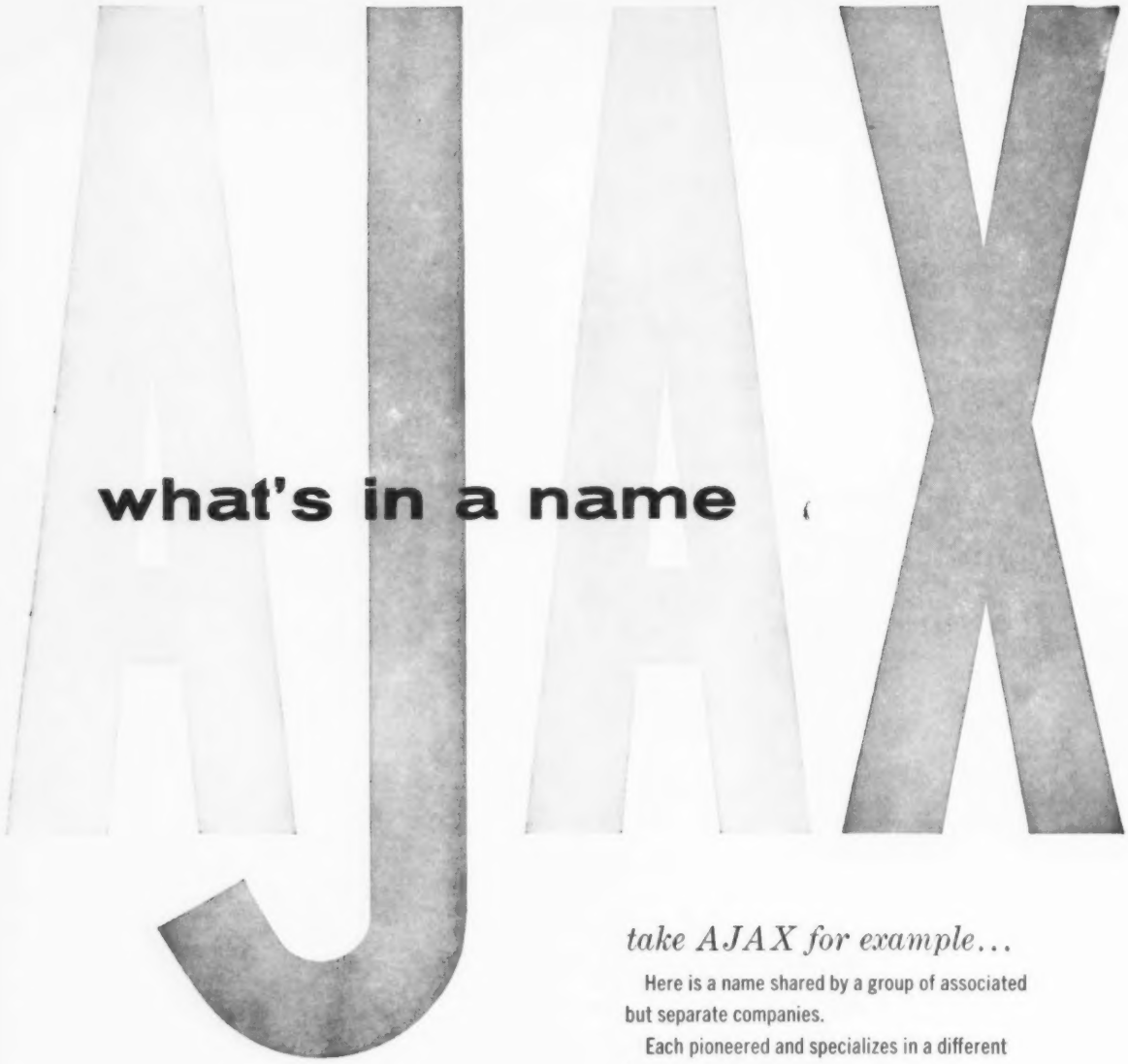
THE BUILDER has had long experience with Stainless Steel. It's easy to install, does not chip or peel, and its beautiful finish presents no problem on matching or replacement.

the owner likes living with Stainless Steel. It's always gleaming and beautiful, cleans with a wipe, and lasts forever. And, to complement her kitchen she loves to own those shiny pots, pans, tableware, and appliances, all made of Stainless Steel.

McLOUTH STAINLESS STEEL

FOR THE PRODUCT YOU MAKE TODAY AND THE PRODUCT YOU PLAN FOR TOMORROW SPECIFY McLOUTH HIGH QUALITY SHEET AND STRIP STAINLESS STEEL

McLOUTH STEEL CORPORATION **DETROIT, MICHIGAN • MANUFACTURERS OF STAINLESS AND CARBON STEELS**



take AJAX for example...

Here is a name shared by a group of associated but separate companies.

Each pioneered and specializes in a different type of electric furnace.

All are bound by a common ideal of group progress.

Though each AJAX company conducts its business on an individual basis, there is a constant interchange of ideas and experiences aimed at furthering your interests. That's why you, as a customer, can depend on the same depth of personal service and technical ability, the same high standards of product quality and performance, from any of the Ajax associates.

Behind **Ajax**, you'll find not just **one** leading company, but an outstanding team . . . with each a leader in its own specialty.

AJAX

ELECTRIC COMPANY
salt bath furnaces

ENGINEERING CORPORATION
low-frequency induction furnaces

ELECTROTHERMIC CORPORATION
high-frequency induction furnaces

AJAX ELECTRIC CO.....980 Frankford Ave., Phila. 23, Pa.
AJAX ENGINEERING CORP.....Trenton 7, New Jersey
AJAX ELECTROTHERMIC CORP.....Trenton 5, New Jersey

The Iron Age INTRODUCES

William H. McKenna, elected president and general manager, **Hanlon-Gregory Galvanizing Co.**

Charles W. Stone, elected president **Interstate Drop Forge Co.,** Milwaukee.

Channing O. Davis, elected president, **Fuller Co.,** Catasauqua, Pa.; **G. K. Engelhart,** named president, **Sutorbilt Corp. of California,** subsidiary of Fuller Co.

L. C. Hewitt, elected vice president, research and development, **The Ironton Fire Brick Co.,** Ironton, O.

Following appointments are within the Lorain Works of National Tube Div., **U. S. Steel Corp.: James O. Light,** named division superintendent, lower works operations; **Luis Sanchez,** named superintendent, Openhearth and Foundry Dept.; **Richard C. Dierker,** named superintendent, bessemer dept.; **Edwin F. Beckwith,** named asst. chief engineer; **Andrew C. Cooper,** named superintendent, roll and tool shops.

S. H. Stupakoff, vice president, is named adviser to the group vice president and to the vice president, research and development, **The Carborundum Co.,** Latrobe, Pa.; **W. H. Wendel,** appointed group vice president, Stupakoff Div.; Coated Abrasives Div., Curtis Machine Corp. and the Globar Div.; **R. A. Barr,** named general manager, Stupakoff Div.

Following promotions are in **U. S. Steel Corporation's** Gary Steel Works' Coke and Chemicals Division: **Hugo S. Wilson,** appointed asst. division superintendent; **Jack D. Blaine,** named superintenednt, by-product and benzol; **Robert L. Land, Jr.,** named superintendent, coke production.

John Papa, appointed plant superintendent, **Hanlon-Gregory Galvanizing Co.**

James L. Rich, named asst. director, Commercial Research Div., **U. S. Steel Corp.**

Stephen H. Van Syke, appointed superintendent, Elyria plant, Pressed Steel Div., **Republic Steel Corp.**

Boyd P. Doty, named asst. manager, sales, Detroit district sales office, **U. S. Steel Corp.; James F. Traa,** appointed manager, sales, Chicago district sales office.

Charles W. Lockhart, named sales manager, Blower and Air Conditioning Div., **Buffalo Forge Co.,** Buffalo, N. Y.

Harold R. Kohl, named manager, manufacturing engineering, foundry dept., Erie Foundries, **General Electric Co.,** Erie, Pa.

Dr. Frank W. Hurd, appointed director, research, **Union Carbide Nuclear Co.,** Div. of Union Carbide and Carbon Corp.

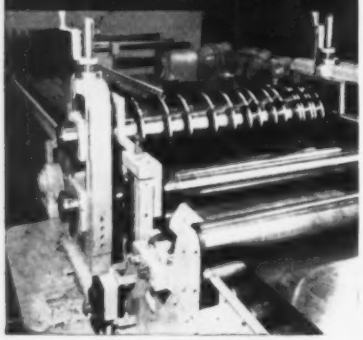
BARTLETT RICHARDS, elected vice president and presidential assistant, Acme Steel Co.

HARRY R. SANOW, elected vice president, Riverdale operations, Acme Steel Co.

JOSEPH H. MYERS, named general superintendent, Riverdale plant, Acme Steel Co.

J. F. FORSTER, elected executive vice president, Vickers Inc., Detroit.

YODER SLITTING LINES



PAY BIG DIVIDENDS WORKING ONLY ONE DAY PER WEEK!

In one plant, two Yoder tube mills and about 50 punch presses are being supplied with slit strands by one Yoder Slitting Line operated an average of only *seven hours per week.*

In another plant, a Yoder slitting line, *operated from six to eight hours per week,* is supplying two intermittently operated roll forming machines with total requirements averaging 100,000 feet per week.

These typical examples demonstrate, first, the big potential output of a relatively small, inexpensive Yoder standardized Slitting Line and, secondly, its big profitability. Assume production of only 35 tons of slit strands per 8 hour shift, one day per week, and the total per year would be 1750 tons. Estimating the saving in slitting cost at only one-half cent per lb., the total annual saving would be $17,500.00.

Besides the big convenience of doing your own slitting, such savings will often repay the investment in a few months.

The Yoder Slitter Book **is a comprehensive treatise on slitter operation and economics, with time studies, cost analyses and other useful data. It is yours for the asking.**

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ENGINEERING YODER MANUFACTURING **SLITTING LINES**

Robert B. Hanna, Jr., named general manager, Industrial Heating Dept., **General Electric Co.,** Shelbyville, Ind.

Richards Burhoe, named St. Paul branch sales manager, Industrial Trades Tape Div., **Minnesota Mining & Manufacturing Co.; Charles R. Yerrick,** named eastern area industrial sales manager, Adhesives and Coating Div.

Mellor W. Stevenson, named general manager, sales, Railway Div., **National Malleable and Steel Castings Co.,** Cleveland; **Howard Stark,** named general manager, sales, Railway Div., St. Louis office.

Ernest F. Bovermann, named general sales manager, Duplicating Products Div., **Minnesota Mining & Manufacturing Co.**

William S. Patterson, named director, executive sales, Pacific Coast region, **Reynolds Metals Co.**

Robert Howard, appointed farm equipment service manager, Tractor Group, **Allis-Chalmers Mfg. Co.,** Milwaukee.

J. K. Gerlach, appointed sales manager, **The Cleveland Punch and Shear Works Co.,** Cleveland.

Scott Vrooman, named sales manager, Detroit, **Joseph T. Ryerson & Son, Inc.,** Chicago; **Bruce D. Clausonthue,** named sales manager, Chicago.

Russel A. Schlegel, named general sales manager and **John R. Hemion** named asst. to general sales manager, **Weston Electrical Instrument Corp.,** Newark, N. J.

L. C. Daniels, named general manager, Buda Div., Tractor Group, **Allis-Chalmers Mfg. Co.; Owen J. Higgins,** named general manager, Harvey, Ill., Works.

Curtis D. Cummings, appointed sales manager, Campbell Machine Div., **American Chain & Cable Co., Inc.,** Bridgeport, Conn.

C. G. HOGBERG, elected vice president, Michigan Limestone Div., U. S. Steel Corp.

RUSSELL P. MAHAN, elected vice president, purchasing, Baird-Atomic, Inc., Cambridge, Mass.

ANDREW J. GRANT, named controller, Clark Controller Co., Cleveland.

SAMUEL N. PRITCHARD, named general sales manager, Henry Disston Div., H. K. Porter Co., Inc., Philadelphia.

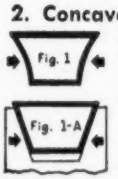
Get more HP delivered per $ of drive cost

No other V-Belt has ALL these advantages

1. Tough, resilient Tensile Cords

Super-strength tensile cords provide 40% greater horsepower capacity . . . easily absorb heavy shock loads . . . reduce number of belts required . . . save weight and space.

2. Concave Sidewalls (U.S. Pat. 1813698)



Concave sides (Fig. 1) increase belt life. As belt bends, concave sidewalls become straight, making uniform contact with sheave groove (Fig. 1-A). Uniform contact means less wear on sides of belt . . . far longer belt life.

3. Flex-Weave Cover (U.S. Pat. 2519590)

A Gates exclusive provides greater flexibility with far less stress on fabric. Cover wears longer . . . increases belt life . . . more power available to driven machine.

4. High Electrical Conductivity

Built into Gates Super Vulco Ropes for safer drives (in explosive atmospheres).

5. Oil, Heat, Weather Resistant

Special rubber compounds make Super Vulco Ropes highly resistant to heat, oil, and prolonged exposure.

Cut sheave width and weight with Gates Super Vulco Ropes

You save on cost of iron . . . you reduce bearing width and support . . . you save space and overall cost . . . when you design a drive using Gates Super Vulco Ropes. Here's why:

5 Gates Super Vulco Ropes do the work of 7 standard V-belts

That's because Gates Super V-Belt has 40% more horsepower capacity than standard belts. Therefore, you can reduce sheave width and weight . . . cut cost.

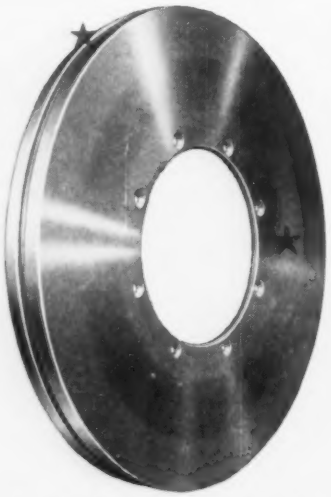
A wealth of drive data is quickly available to you. Simply call your nearby Gates V-Belt Distributor (see 'phone book yellow pages) for a Gates V-Belt specialist. Stocks available in industrial centers around the world. The Gates Rubber Co., Denver, Colorado—*World's Largest Maker of V-Belts.*

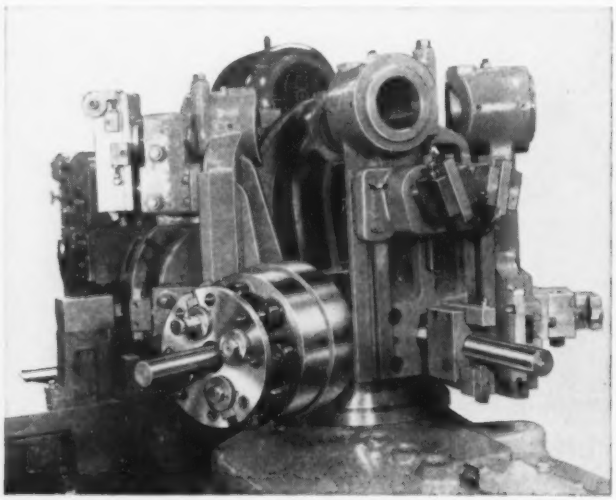
The Mark of Gates *Specialized* Research

TPA 91 A

Gates Super VULCO ROPE Drives

Passes Stiff Production Test with NO BAD MARKS !





- **A POTTER & JOHNSTON 6DRE-40 AUTOMATIC . . . does the job quickly, economically.**
- **P&J-ENGINEERED TOOLING . . . insures fine finishes with NO RETURN TOOL MARKS.**

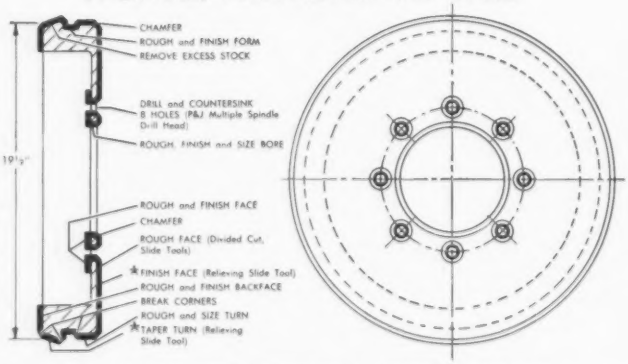
Job Facts:

THE PART: Cast iron tub bottom.

REQUIRED: 26 separate roughing and precision finish cuts including: 2 critical surfaces to be machined without return tool marks . . . and 8 holes on a diameter to be drilled and countersunk.

MACHINING: Finished in just 8½ minutes per piece . . . *floor-to-floor time!* Use of relieving slide tools eliminated return tool marks; a P&J Multiple Spindle Drill Head handled all 8 holes simultaneously; no need for a secondary operation; extensive use of standard, basic tools throughout the entire setup kept tooling costs to an absolute minimum.

A SINGLE, FULLY-AUTOMATIC CYCLE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ROUGH and FINISH FORM
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DRILL and COUNTERSINK 8 HOLES (P&J Multiple Spindle Drill Head)
ROUGH, FINISH and SIZE BORE
ROUGH and FINISH FACE
CHAMFER
ROUGH FACE (Divided Cut, Slide Tools)
★FINISH FACE (Relieving Slide Tool)
ROUGH and FINISH BACKFACE
BREAK CORNERS
ROUGH and SIZE TURN
★TAPER TURN (Relieving Slide Tool)

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Several factors — the number and complexity of the cuts involved, the high accuracy and fine finishes required, and the speed with which these pieces are produced . . . make this an unusually interesting job. But remember, performance like this is the rule — not the exception — when you team a Potter & Johnston Automatic Chucking Turret Lathe with P&J Tooling. Here is a winning combination that can help you improve quality, increase output and cut costs on your toughest jobs. Send now for complete information on the 6DRE-40 and the other Automatics in the complete P&J line. Write to us direct . . . or phone the Pratt & Whitney Branch Office near you for a Direct-Factory Representative to discuss your requirements. *Potter & Johnston Company, Pawtucket, Rhode Island (Subsidiary of Pratt & Whitney Company, Inc.).*

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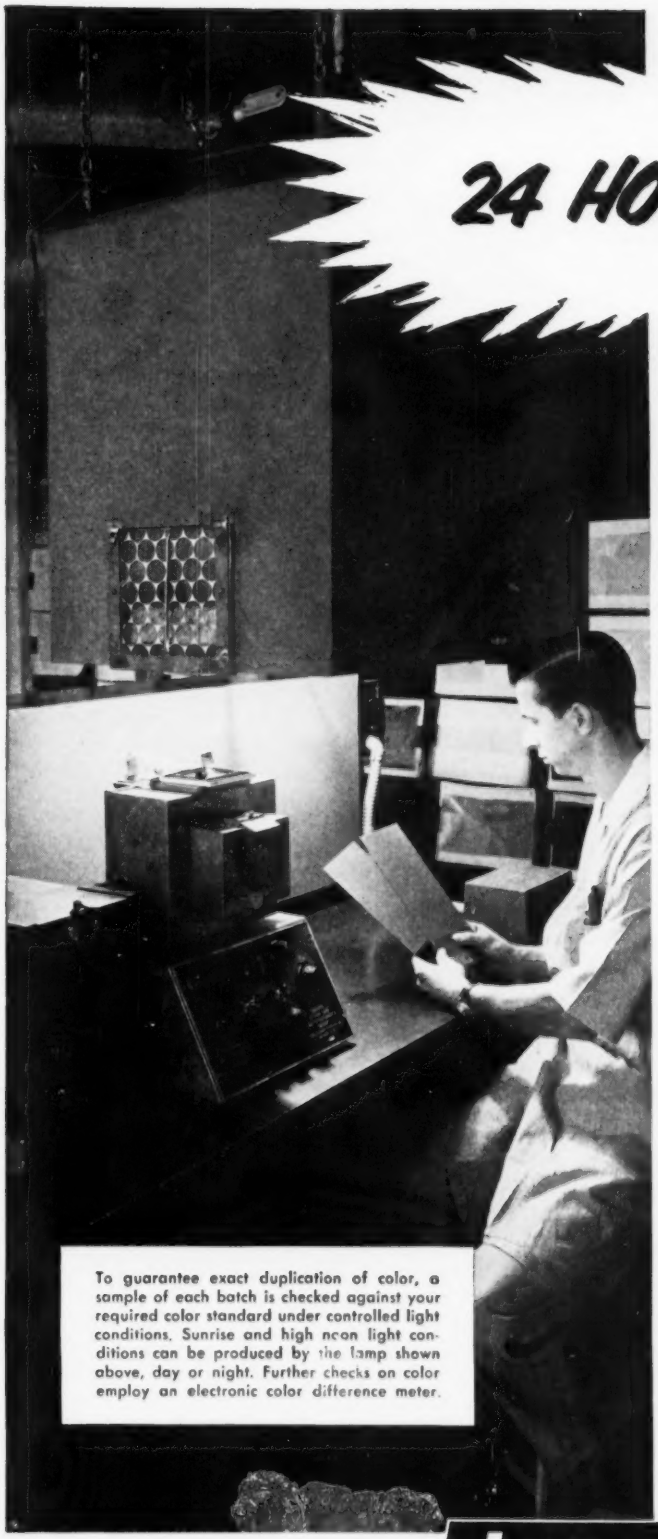

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B. E. Berry, named general manager, French & Hecht Div., **Kelsey-Hayes Co.**

Sven E. Widen, appointed asst. sales manager, **Atrax Co.,** Newington, Conn.

Herbert H. Hager, named general superintendent, steel production, **Firth Sterling Inc.; Thomas E. Landy,** named superintendent, production planning.

Robert R. Gabriel, named branch manager, Asheville office, Edison Voicewriter Div., **McGraw-Edison Co.**

Earl A. Neeb, appointed plant manager, Toronto, O., plant, **Titanium Metals Corp. of America.**

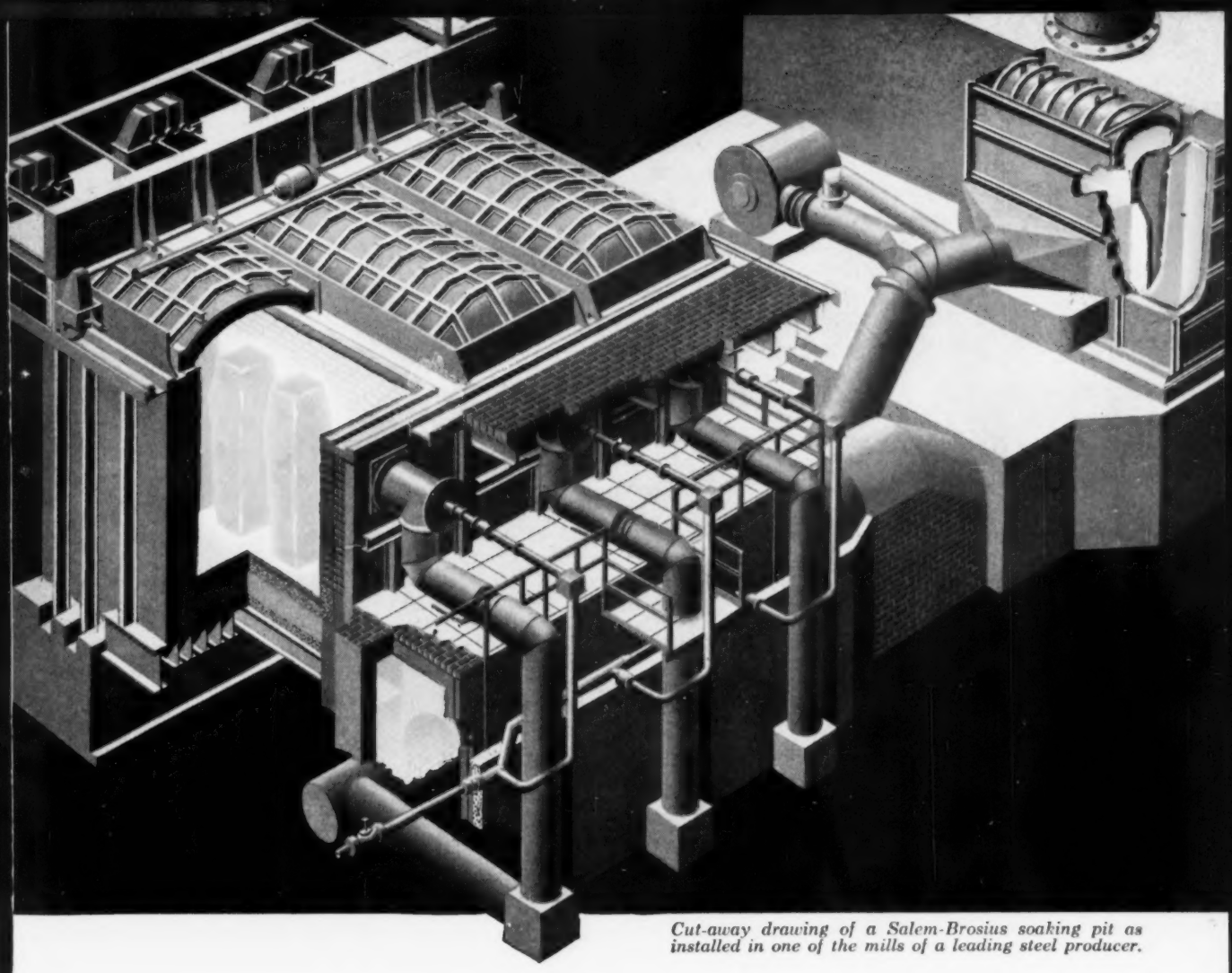
John M. Miller, named asst. general sales manager, **Joyce-Cridland Co.,** Dayton, O.; **Robert M. Tormey,** named sales manager, Jack Div.; **Ralph Nyborg,** appointed sales manager, Materialift Div.

Robert G. Hill, named sales manager, Original Equipment Div., **Leece-Neville Co.,** Cleveland.

Charles F. Birkhauser, named controller, **United States Chemical Milling Corp.,** Manhattan Beach, Calif.

Edwin G. Chapman, named plant manager, Experimental Div., **Misco Precision Casting Co.,** Muskegon, Mich.; **Joseph W. Campau,** named plant manager, Detroit Div.; **Emery E. Kuhary,** named chief engineer, Experimental Div.

Ralph C. Gibbs, named asst. purchasing agent, **Standard Pressed Steel Co.,** Jenkintown, Pa.



Cut-away drawing of a Salem-Brosius soaking pit as installed in one of the mills of a leading steel producer.

Users are the best salesmen of Salem-Brosius soaking pits

"We have again specified Salem-Brosius soaking pits for our expansion program," reports an operating official of a major steel company using pits installed by several manufacturers. "The previous installation heated more steel ingots ready for rolling with less fuel consumption, less maintenance cost, and better temperature uniformity than any other type of pit in our plant."

Reports like this are typical, not only about soaking pits, but all other Salem-Brosius heating and heat-treating furnaces as well. Salem-Brosius engineers, both here and abroad, possess an enviable record for designing furnaces which produce maximum, high-quality output at minimum operating cost. If your expansion or modernization plans call for ingot soaking pits or any other heating or heat-treating furnaces, Salem-Brosius, Inc. would appreciate an inquiry.

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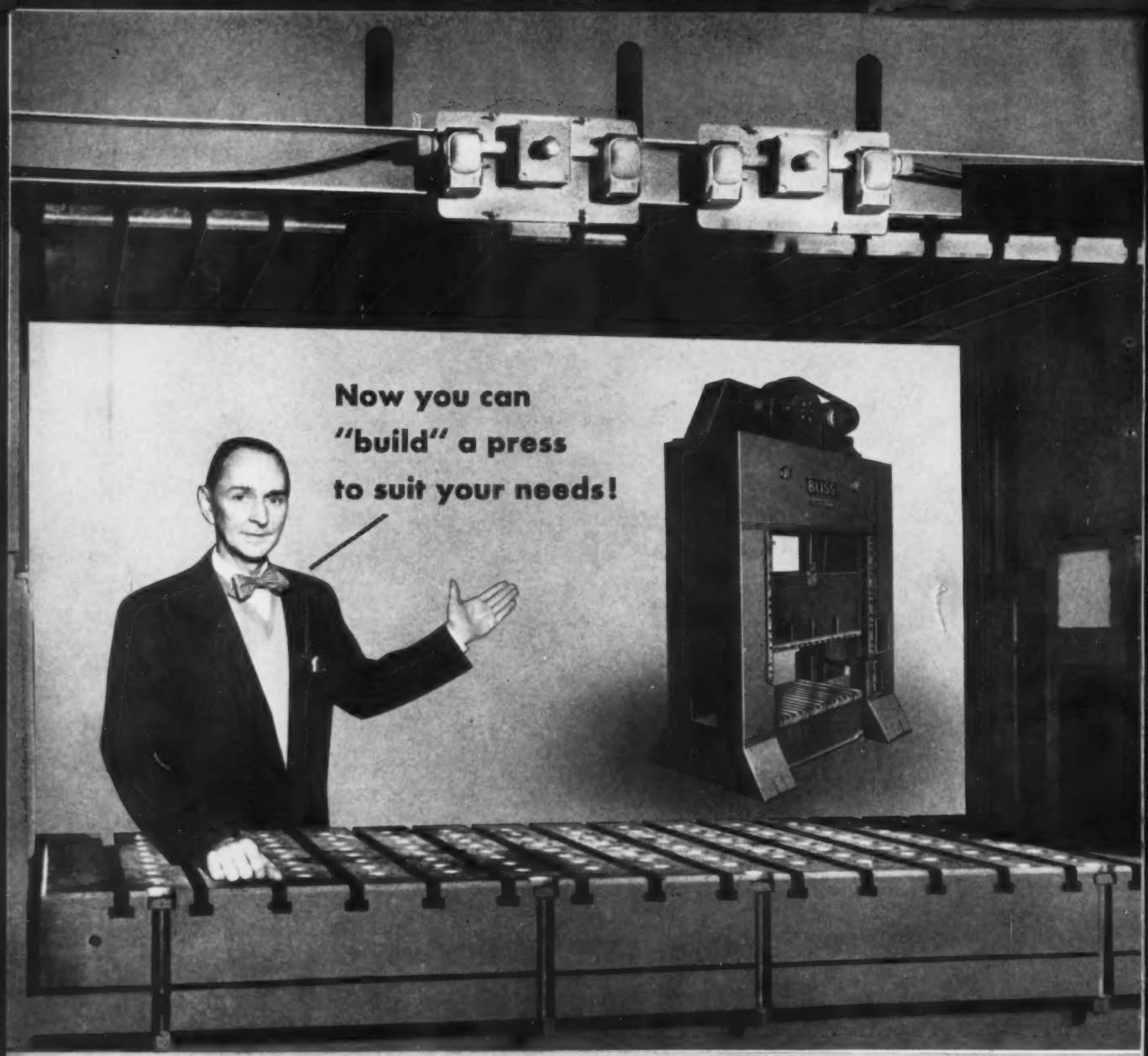

Why buy a press designed for someone else?

To these basic design advantages of the new Bliss SE-2 press . . .

- Enclosed design, all-welded construction, four-piece frame with tie rods drilled for electrical shrinking
- Recirculating oil system for gears, shafts, bearings, slide adjustment and *flywheel roller bearings*
- Bronze liners on the slideways running against lubrized cast iron gibs
- Motorized slide adjustment
- Counterbalance tanks
- JIC sizes
- Anti-friction bearings on *intermediate shaft* as well as on flywheel

. . . you can add any or all of these optional features

- Provision for automation controls and feeds
- Inbuilding
- Recirculating oil to the slide gibs
- Recirculating oil to the cushion gibs
- Automatic lubrication to counterbalances and cushion internals
- Air and electrical maintenance outlets
- Die lights
- Air control manifolds
- Special controls

A Bliss Chief Engineer tells...

How press buyers can "tailor" Bliss' new eccentric-gear design to fit their own needs!

"It's almost impossible to design a large press to please everyone. Yet that's exactly what we have tried to do with our new one point, two point and four point presses," says Chief Engineer Bill Staecker, of Bliss' Canton Plant.

"Here is how we approached the problem. Our field sales engineers worked for months with customers' operating executives and our press designers. On the one hand were the widely varying requirements of the big automated mass-production stamping plants; on the other, the needs of the job shops who use their presses for short runs. It was rare to find two sets of requirements alike.

"Flexible" design proves answer

"It was apparent that what was needed was a *flexible* basic design—a press that could have features added or subtracted to meet any user's needs without making him pay for features he didn't want. You can see how we have solved the problem by looking at the table of specifications at the left.

New drive cuts maintenance

"But...above and beyond the benefits of this basic design, these new Bliss presses have a 'unitized' drive mechanism based on a special *demountable* flywheel and outboard clutch. To get an idea of what this unitized design does for maintenance, consider these facts:

"Except for the main gears, nothing is built into the crown. The entire drive can be removed as a unit. Belts can be replaced without removing anything but the brake pins. And the entire clutch can be taken off simply by removing the brake bracket.

"You can see what this ease of disassembly and reassembly means when you compare it to maintenance steps on your present enclosed presses."

To sum up, when you buy one of these new presses, you pay for just what you need *and no more*. And you're buying the only fully-enclosed straight side press that is truly easy to maintain.

The new Bliss eccentric-gear presses are available in a full line of tonnages in both double and single geared models. For full details, write us today.

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The large weldment above is a 40-Ton Blank Holder for a 1000-Ton Press . . . this piece, and those illustrated at the left, are typical of thousands of Steel-Weld Fabricated parts and assemblies produced by Mahon for manufacturers of processing machinery, machine tools, and other types of heavy mechanical equipment. Are you taking full advantage of the possibilities offered by welded steel components in your product? In the design of almost any type of heavy machinery there are parts and sub-assemblies that can be produced more economically and more satisfactorily in welded steel, because, in weldments you get greater strength with less weight, plus the additional advantages of greater rigidity and predictability. If you are considering weldments, you can call on Mahon with complete confidence, because, the Mahon organization is a unique source for welded steel in any form . . . a reliable and responsible source with complete facilities for design engineering, fabricating, machining and assembling . . . a source where design skill is supplemented by craftsmanship which assures you a finer appearing product embodying every advantage of Steel-Weld Fabrication. See Sweet's Product Design File for information, or, better still, have a Mahon sales engineer call at your convenience.

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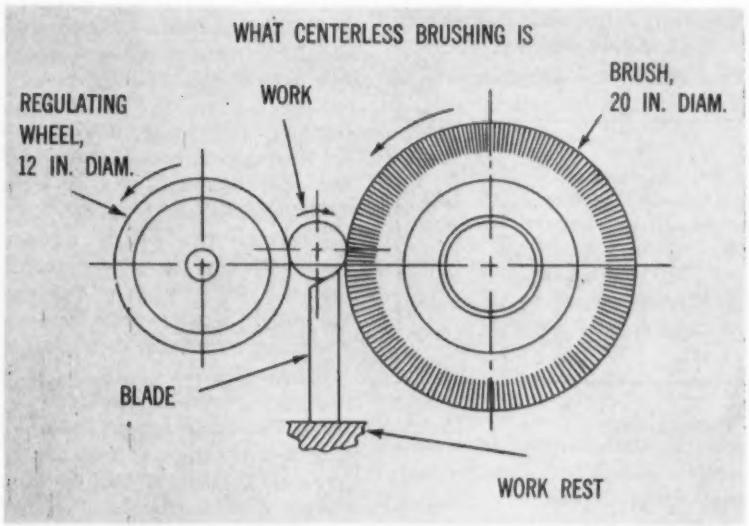
MAHON

Why Centerless Brushing Finishes Faster

By R. C. Sasena—Project Engineer, The Osborn Mfg. Co., Cleveland, O.



HERE'S HOW IT FINISHES: Work rests on adjustable support. Regulating wheel stops work from spinning at high speed under brush pressure. It turns slowly under gear or electrical control to establish rotating speed of work. It also helps support and feed work.

PUMP ROD LASTS LONGER: Centerless brushing blends slight but important surface irregularities on alloy steel pump rods. Workpieces feed straight through machine, minimizing handling.

You know about power brush finishing. But have you tried it without centering chucks?

Centerless power brushing may be what you need to revive a sluggish finishing line. It's fast, fits well in mass production.

Brushes finish parts to a few microinches at low cost. High part volume is easy to get.

■ Centerless power brushing differs from normal brush finishing. The technique solves a production problem that's threatened for some time to slow down some finishing lines.

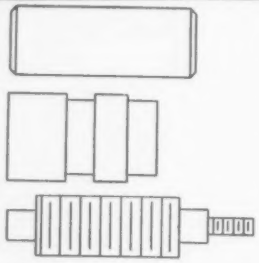
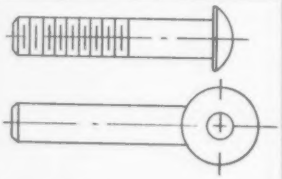
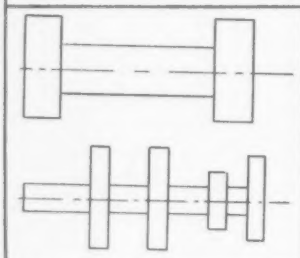
If you use—or plan to use—automatic or semiautomatic finishing equipment, the trouble is plain to see. For high production, workpieces must enter and leave machines in the shortest possible time.

Power brushing without centering chucks cuts loading and unloading time sharply. Parts go in the brushing machine one right after another. If through-fed, they emerge from the opposite side without even slowing down.

It's unnecessary to hold parts during centerless brushing. This reduces nonproductive machine time. Consider, for example, 4-in. long parts feeding at 16 fpm. They pass the power brush at 2880 parts per hour, assuming 100 pct efficiency. For power brushing, this is mighty fast.

Feed Faster — Through-feed, centerless machines can be set up

How To Feed Parts In Centerless Brushing

Typical Workpieces	Type of Feed
	**Use Through-Feed:** to finish-brush parts similar to those at left. Work feeds past brush, and out opposite side in continuous, uninterrupted motion. Through-feed brushing finishes only largest diameter of multi-diameter parts. This large diameter must be long enough so part doesn't cock as it moves past brush.
	**Use In-Feed:** on headed work (see left) where only cylindrical body needs finishing. Adjustable end stop prevents head from entering, ejects completed work.
	**Use In-Feed:** to finish all diameters of multidiameter parts (see left). Employ contoured brushes wider than work. In loading, regulating wheel backs away for clearance. After finishing, regulating wheel again withdraws, and end stop ejects part.

in tandem. This enables higher feed rates. Or alternately, tandem rigs can handle more than one finishing operation on the same line.

Where centerless brushing follows on the heels of another centerless finishing process (such as grinding), other benefits show up. You get these by installing the brushing setup in the line. Then work can pass from one machine to the next without operator attention.

Centerless brushing applies centerless grinding basics to automatic power brushing. A large brush replaces the grinding wheel.

Brushes are filled with wire, tampico fiber, cord or synthetic brush material. Choice of filler depends on type of work, material and finish desired. Abrasive compounds may or may not be used.

Chucking Is Out—In centerless brushing, the part is not supported between centers. Standard, commercially available, centerless grinding machines can power the brushes. Specially designed equipment also is available.

Centerless brushing doesn't usually call for the accuracy needed in precision grinding. That means used or reconditioned centerless grinders can often answer brushing needs at low cost.

The centerless brushing machine for external cylindrical or formed work consists of two wheels. Each mounts horizontally. Wheel surfaces oppose one another (see illustrations on preceding and facing pages).

Lifts Part—An adjustable blade sits between the two wheels. It supports the workpiece.

The larger wheel (about 20 in. in diam) does the brushing. It fastens directly to a standard 14-in. hub. Weights correct dynamic balance of the brush.

The smaller wheel regulates workpiece spin. It rotates slowly and brakes the part. That prevents the work from spinning as fast as the brush. Speed of the regulating wheel adjusts through either rheostat control or change gears.

Wheel Cocks — The regulating wheel also controls part feed rate. Tilt the wheel axis to change feed rate. After adjusting the wheel axis, you must true up the regulating wheel face with the pass line of the work. A truing device in the machine helps here.

The work rest blade supports the part as it moves past the brushing face. Blade thickness will vary with part diameter.

Parts in centerless brushing can feed two ways. The drawings nearby show how.

Mechanize Feed—Commercially available mechanical and electrical devices can feed parts automatically to the centerless brusher. Vibrating hoppers are an example. Such hopper feeds will enable one operator to service several centerless brushers.

Brushes filled with 0.008-in. diam and coarser wire generally find use for (1) satin finishing, (2) roughening surfaces, and (3) removing scale and shop dirt.

Brushes filled with 0.005-in. diam wire produce fine-satin finishes. They also remove such surface contaminants as metallic oxides, light scale and heat discoloration. Surface finish of rough- and finish-ground parts can be improved too. With an abrasive compound, expect even better surface finishes of these brushes.

Brushes filled with treated tampico fiber, brush filaments or cord remove light burrs, light scale and surface discoloration. They also will finish surfaces down to 3 to 12 microinches rms.

Shop Performance — Tables I and II show capabilities of centerless brushing. Parts concerned are production-ground automotive piston pins measuring about 3¼ in. long and 1 in. O. D.

Centerless brushes generally last at least six months. Under some conditions, they continue in service more than two years.

Automated and other in-line production setups find real use for centerless brushing. Brush finishing of steel pump rods is typical.

TABLE I What Centerless Brushing Will Do After Final Grind

Finish, microinch rms	Brush type	Post-brushed finish, microinch, rms (8.3 fpm pass speed)	
		First pass	Pct improvement
19.7	wire,	11	44
13.6	0.005 in.	7.4	46
9.7	diam	7.1	27
19.5	treated	9.9	49
19.5	tampico	11.3	42
19.3	fiber	8	58
19.2	plus	9.1	52
19.1	compound	10.6	44
9.0		5	44
7.1		6.8	3

TABLE II What Centerless Brushing Will Do After Rough Lap

Finish microinch rms	Brush type	Post-brushed finish, microinch, rms (8.3 fpm pass speed)			
		First pass	Pct improvement	Second pass	Pct improvement
6.1	treated	3.6	41	2.1	41
5.8	cord	3.4	41	2.3	32
5.8		3.7	36	2.6	30
5.5		3.5	36	2.9	17
5.0		3.7	26	2.4	35

BETTER PISTONS: Brushes mount here on standard centerless grinders. The smoother piston finish eases assembly.

The molybdenum-nickel steel rods vary from 1⅛ to 1½ in. diam, and from 6 to 36 ft long.

A centerless grinder first removes 0.006 in. from the rod surface. Finish grinding takes off another 0.002 in. The rod then moves to the centerless brushing machine.

Get Better Part—Brushing there blends slight but important surface imperfections and irregularities. This instead of removing metal. Blending actually refines the surface. It's not confined just to the high spots. Edges of pits and grooves in the metal surface blend so as to change the focal stress pattern favorably. Corrosion resistance of the rod improves.

Brusher operation is relatively easy. One man loads rod on the feed carriage. A slightly-angled regulating wheel forces the rod past the brushing surface. The wheel spins at 52 rpm. In minutes the job is done.

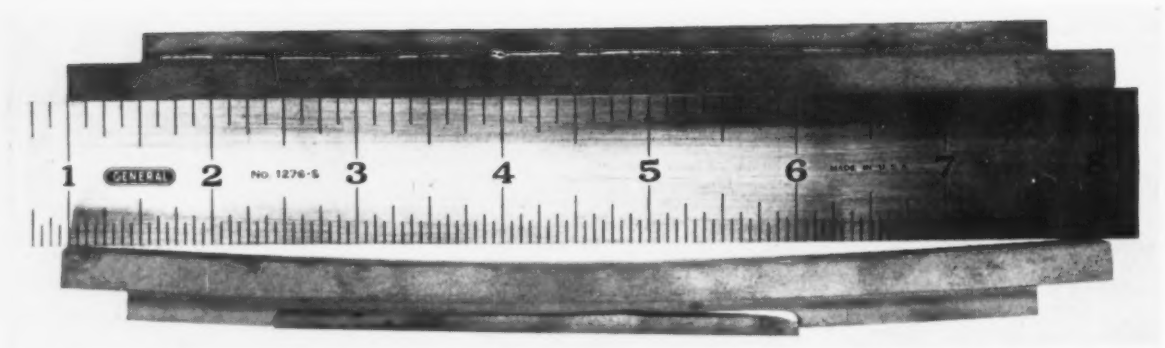
Where Centerless Brushing Is Used

Deburring lands of automatic transmission valves
Cleaning barstock
Roughening surfaces for adhesive bonding
Removing foreign matter from electric rotor laminations
Deburring round steel blanks
Improving finish on cylindrical tubing
Improving finish on roller bearings, bearing races
Blending grinding marks from steel barstock
Improving finish on hydraulic cylinder piston rods
Refining surface on Type 410 stainless barstock
Removing nitride film from ground threads
Deburring valve pistons
Satin finishing aluminum and brass tubing
Deburring steel bushings
Light deburring on steel micrometer screw threads
Removing graphite and dirt from valve guide rods

Speeds Assembly — In piston manufacture, centerless brushing eases assembly, also prolongs smooth working life of part.

Wire brushes 20 in. in diam mount on standard centerless grinders for piston finishing. The brush face is 6 in. in diam. Wires are tool steel, rotate at 1200 rpm.

Pistons are machined, ground, then brushed. Work feeds by gravity down a magazine-type chute. The regulating wheel is angled to rotate the part and push it through the brush area. Production exceeds 10,000 pistons in eight hours.



IN JOINING steel bar to carbide wear surface, silver soldering heat can distort workpiece (bottom).

No-Mix Epoxy Joins Metals Fast

By **Bernard Gould**—Development Manager, Rubber & Asbestos Corp., Bloomfield, N. J.

Epoxy adhesives for metal joining are well accepted in aircraft circles.

Some epoxy's are well suited for low-cost, high-volume joining on a number of other jobs.

One such adhesive spreads directly from the can. It cures to a strong bond without additives.

■ "Epoxy adhesives are good for aircraft work," has been the word. "But not for low-cost, mass production joining." There's doubt whether this statement ever was true, even as a generalization.

Now field reports point out that the attitude is at least misleading, if not downright wrong. So say many users of the one-part epoxy adhesives now available.

What brought about renewed interest in epoxys for joining?

From the Can—Development of ready-to-apply epoxy resins is part of the answer. It parries complaints about short pot life, need for skilled workers and multiple-step procedures more suited to the experimental shop than high-volume lines.

But all this doesn't mean much by itself. You have to add the factors that first stirred interest in epoxy resins as a group.

Adhesives generally offer certain advantages in metal-to-metal joining.

No Heat—First, they join at relatively low temperatures. This helps avoid workpiece distortion, embrittlement and thermal cracking—common troubles where heat is involved.

Second, they promise low-cost joints. But this can be realized only if three conditions are present. Joining material must cost little. The joining method must be simple. And it must lend itself to mass production methods. Epoxys can now meet these conditions.

Third, adhesives spread the load over the entire bonding area. This contrasts with more widely used fastening and joining methods in which stresses usually end up along seams or around holes.

Lower Weight—In addition, adhesives generally will (4) join dissimilar metals, (5) ease the job of fastening thin parts, (6) seal and insulate as they join, (7) dampen vibration to some extent, and (8) in many cases, permit lower part weight.

With all these advantages, it's obvious severe drawbacks must exist. This for adhesives generally, and epoxys as well. Otherwise adhesive bonding would have swept the fastening field long ago.

Handicaps of adhesive joining are several. They include (1) comparatively low joint strength, (2) at times poor resistance to moisture, sunlight, chemicals, aging and the like, (3) complex joining methods, and (4) related to the last, a higher cost per joint than appeals to many.

Perform Well—Before going on, there's a word of caution. Don't overestimate the importance of these limitations. Adhesives in general can often handle jobs no other fastening or joining method can do as cheaply, as quickly, or as well. Aircraft usage typifies this last.

Now where do epoxy adhesives rate in this list of limitations?

Even before now, epoxy bonds have given good to excellent service. They resist a long list of harsh environments that weaken or destroy many other adhesive bonds. In over-all resistance, cured epoxy approaches Teflon in inertness.

Heat resistance is fair. Epoxys retain useful bond strength up to at least 300°F. Where strength is not a factor, they will withstand 500°F service. Temperatures between +175°F and −65°F affect cured epoxy bonds little.

In ease of application, some of the newer epoxy adhesives show up well.

Avoid Mixing — Consider the one-part epoxy adhesive mentioned earlier. It's applied directly from

EPOXY ADHESIVE successfully joins carbide balls to stainless steel. Both here and in adhesive bonding carbide to steel (see illustration at left, top), distortion has been eliminated.

the can. No curing agent is needed. No mixing is involved. Relatively unskilled labor does the job. Storage life exceeds two years.

Coupled with a cost near $2.00 per pound, this points the way toward low-cost adhesive joining in mass production.

The one-part epoxy adhesive stays where it's put. A thixotropic agent sees to that. You can spread the adhesive on a vertical or overhead joint; it will not drip or flow.

This applies before, during or after the curing cycle. Even in oven heat, the material stays put. By carefully spreading the adhesive before assembly, you avoid post-cure cleanup.

How To Cure—With the one-part adhesive, you get a wide choice in curing cycles. Depending on what heat the assembly will withstand, the epoxy can cure from 260° to 535°F. As Table 1 shows, lower temperatures call for longer curing times.

Non-epoxy adhesives often require pressure for strong bonding. Recommended pressure for epoxys is 5 to 15 psi. The workpiece weight usually supplies this.

Under this pressure, the glue line runs between 1-2 mils. This thickness develops the highest bond strength.

Speed Joining—No special bonding techniques, pressures or fixtures means one-part epoxys are useful on mechanized joining lines. A simple conveyor belt moves parts through oven tunnels or banks of infrared lamps.

Bond strengths of cured epoxy joints are good. It's reported they equal or better those of most other adhesives. Tensile shear strengths higher than 2000 psi are common. Block shear strength, a more informative property, runs up to 8000 psi.

The adhesive contains no solvent: It is 100 pct solids. So voids in the bonding area that reduce strength are rare.

A comment about joint strength here may answer some questions. It's easy to be misled. For example, a cured epoxy bond shows a tensile strength upwards of 43,000 psi. Impressive though this value is, it bears little relation to its holding power in an adhesive joint.

Aircraft Only — Tensile shear strength is commonly quoted for adhesive bonds. It's measured usually by pulling apart two 0.064-in. thick metal strips, bonded together in an overlap joint. In aircraft work, tensile shear tests obviously relate to service conditions.

But where thin metal is not joined to thin metal, tensile shear values don't necessarily apply. Some adhesives people say they should not be used. They suggest block shear strength instead. For this, you strip apart two bonded, ½-in. square metal blocks by shear forces. Block shear values often differ greatly from tensile shear values.

All this makes a one-part epoxy adhesive attractive for many short and long run assembly jobs.

Replaces Solder—In some, it replaces lead-tin or silver soldering. This doesn't happen because the adhesive bond equals the silvered-soldered joint in strength or toughness. Rather, silver soldering was the best way of doing the job earlier: Its strength was an unneeded extra. Savings in such cases on cost of materials alone can reach 90 pct.

Like most materials, the one-part epoxy has its limits. Right now if you need high peel strength or impact strength, you must return to a two-part epoxy system.

The inert nature of epoxys has its negative side. No common solvent will dissolve the cured resin. Neglect to clean spilled resin before curing, and it may take a chip hammer to get it off.

This trait more often has value than not. But epoxy suppliers will welcome a solvent for the cured resin.

Table 1

Alternate Curing Cycles For One-Part Epoxy Adhesive

Curing temp*, °F	Minimum curing time
260	20-24 hours
300	4-5 hours
350	1½-2 hours
400	40-50 minutes
450	20-25 minutes
500	12-15 minutes
535	7-10 minutes

*in the bonding layer

Why One-Part Epoxy Adhesives?

- No mixing
- No curing additive
- Long storage life
- Easy to apply
- No dripping, oozing
- Variable curing cycle
- Relatively high bond strength
- Chemically stable

WORKS FAST: This machine doubled productivity cutting 1-in. plate; multiplied it fivefold on 2½-in. size.

Abrasive Cutter Sales Through Tough Superalloys

By Curtis Cummings—Campbell Machine Div., American Chain & Cable Co., Inc., Bridgeport, Conn.

Today's crop of tough, new alloys is probably only a patch on what's coming up.

Once found, how to fabricate them? Solution lies in revamping some current techniques, finding new ones, too.

Abrasive cutting is stepping forward as a method well-suited to current and future needs.

■ Today's pressures for developing better engineering materials—intense as they are—are probably only a patch on what tomorrow will bring. But finding materials more highly resistant to corrosion, temperature and wear is only half the battle. If it doesn't go hand-in-hand with finding better ways to fabricate them, they remain only laboratory toys.

The ultra-tough superalloys are a prime example. They've become increasingly useful only as metalworkers have been able to modify —or in some cases supplant—the time-honored methods for producing, shaping and cutting metals.

Emphasis Changes—In a few instances, this constant re-assessing of techniques has brought about some marked changes in emphasis. Some methods in baby-buggy stages only a few years ago have come up—almost overnight —to win wider commercial acceptance.

Abrasive cutting's a for-instance. It could hardly be lumped in with the "almost overnight" group of fast-rising methods—it's been around too long. But it has won wider recognition as the best way to cut most hard materials, and the only practical way to cut some. Result has been that—where a generation ago, abrasive cutting was used only for the most difficult operations — today it's widely used for cutting all kinds of steels and alloys, as well as glass, ceramics, and plastics, and other materials.

Latest Equipment — A heavy-duty abrasive cut-off machine bought recently by Haynes Stellite Co. demonstrates the progress made.

The unit was purchased for Haynes' wrought alloys plant in Kokomo, Ind. The plant makes special products used for many purposes. Plate, for instance, may find its way into large chemical tanks which must stand up under severe corrosion conditions. Sheet may go into jet-plant tailpipes, to

withstand critical and extremely high temperatures. Barstock finds use in pump and agitator shafts and in valve stems, items serving throughout industry wherever highly corrosion-resistant equipment is needed.

Wire used for welding aircraft parts and other components has to stand up under severe temperature changes. And it has to be able to stand off corrosion.

Answer With Alloys—To meet these requirements, Haynes turns out Hastelloy and Multimet and other high temperature and corrosion-resisting alloys. These are put out in sheet, plate, wire and bar form.

Campbell Machine Div. of American Chain & Cable Co. made the machine, which uses abrasive wheels made by American Chain's Allision Div. The horizontal plate-cutter is a far cry from the more common and smaller hand-fed wheel type devices using small resin-bonded wheels. It handles large, irregularly shaped sheets and plates, taking workpieces up to 20 ft long by 72 in. wide.

Bites Cleanly — It will bite cleanly through any thickness up to 3 in., at a rate of 4 to 6 sq in. per minute. This is a marked improvement over previous production rates.

CENTRAL CONTROL: Operator regulates all motors, wheel adjustments, coolant, and wheel height from this station, regardless of where wheel head may happen to be. Note plate section, right.

Accuracy is good. The machine will cut Hastelloy, for instance, to an accuracy of ± 1/32 in.

The unit is helping cut costs both in the Haynes plant and in those of consumers. Machining time has been minimized and milling and edge grinding operations are practically eliminated. Based on material and time savings already being realized, the plate cutter will amortize itself in seven years. That's based on a 40-hour

For Best Abrasive Cutting Results:

1. Select the right machine for your particular operations. No one type performs effectively on all cutting jobs.

2. Pay particular attention to these factors: design of work holders, application of coolant, rigidity of machine and type of controls. General arrangement of the machine from the standpoint of convenience of the operator is also important.

3. Play safe by having conclusive tests run on the particular material to be cut. Then obtain sample cuts that can be held for comparison with performance in production. This permits adequate, periodic performance checks, since the first indication of a poorly adjusted machine or an unsuitable wheel is poor cuts.

4. Provide for removal of chips. Since an abrasive cut-off machine produces fine chips at a far greater rate than any comparable equipment due to its high production rates, this is an absolute essential. Chip pileups will decrease coolant flow, producing inferior cuts and seriously impairing abrasive wheel life. Filters or chip separating equipment are not necessary, since the chips will settle out in the coolant tank and can be removed.

5. Pay close attention to make sure the work holder is in first-class condition. You can't get highly accurate cutting if work holders won't properly align the work.

6. Use only those abrasive wheels particularly made for your machine and recommended by an abrasive cutting engineer.

7. Don't neglect the possibility, when investigating the potentialities of abrasive cut-off equipment, of cutting production costs through the method's ability to cut hardened, or unannealed, material. Also, to produce fine-finished, accurate lengths.

8. Figure costs carefully. Ordinarily, cutting off estimates can be made on solid bar steel on the basis of 6 seconds cutting time per square inch of material. This for material up to sizes containing 3 sq in. of cutting. Larger sizes require slightly more time per square inch. Assuming that both wheels and machines are correct for the type of work involved, abrasive wheel costs can be figured at about $.004 to $.006 per square inch.

TEST PLATE DIMENSIONS	START DIAM.	FIN. DIAM.	THICKNESS	NO. OF CUTS	CONTACT TIME CUT	SQ. IN. AREA—METAL CUT	SQ. IN. AREA—WHEEL USED	RATIO METAL WHEEL
15 3/16 in. x 3/4 in.	18 3/32 in.		.135 in.	1	1 minute, 52 seconds	11.391 in.		
9 3/8 in. x 1 1/2 in.		17 7/8 in.	.134 in.	1	2 minutes, 32 seconds	14.062 in.		
					Total	25.453 in.	6.18	4.12
12 5/8 in. x 3/8 in.	18 3/32 in.		.133 in.	1	17 seconds			
		18 1/32 in.		1	18 seconds	9.46 in.	1.77	5.34
54 3/16 in. x 1 in.	18 3/32 in.		.132 in.	1	6 minutes, 12 seconds			
22 11/16 in. x 1 in.		17 3/4 in.		1	5 minutes, 6 seconds	76.875 in. Totals	9.68 Total	7.94 Total

Table 1: These results were obtained in a series of tests run on Hastelloy Alloy C plate. An Allison DA46-Q-RH4 wheel 18 x 0.135 x 1 in. in size was used.

Advantages of abrasive cutting have been successfully tested and proved for cutting steel plate and the toughest alloys

week. Actually, it's been working on a round-the-clock, three-shift, 7-days-a-week basis, and will pay for itself much sooner than original estimates would suggest.

Sizeable Unit — Specifications are impressive. Total weight is 93,000 lb, and overall dimensions are 38 ft length, 9 ft width, and 7-ft 2-in. height. The bed of the machine is made up of four individual pedestals of heavy steel construction.

Height from the floor to the top of the work table is 38 in.

A 25-hp motor powers the main drive. The machine also has a 3-hp hydraulic motor, a 1/3-hp elevating motor and a ¼-hp coolant pump motor.

Uses 20-in. Wheel — The machine is equipped to use a 20-in. abrasive cutting wheel. Clearance from the bottom of the wheel to the top of the work table is 5 in. The machine can cut workpieces across a 72-in. width at any point and regardless of length.

Controls are located at the extreme left side of the machine, to the front. The operator controls all motors, wheel adjustments, coolant and wheel height from this station, regardless of position of wheel head in relation to the control station. The horizontal wheel feed, of the hydraulic type, is infinitely adjustable.

Maximum feed of wheel head is up to 20 fpm.

Advantages Proved — Advantages of abrasive cutting have been successfully tested and proved for cutting steel plate and the toughest alloys. With this type machine, the wheel can be fed horizontally across the work any number of times, and fed downwardly at the end of each stroke.

One of two cutting methods may be followed, depending on the thickness of the material. A rubber-bonded wheel is used for either.

The first (and more accurate) calls for a series of cuts, the initial one being about 1/16 in. deep across the entire face of the plate. This comparatively light cut is made without undue stress being placed either on the wheel or the machine.

After this highly accurate "scoring" cut, the wheel is lowered anywhere from 1/6 to 3/32 in. at the end of each stroke. The wheel follows the scoring and successive cuts with each lowering, until the work is completely severed. The work surface appears as smooth, at the end of the operation, as if only one cut had been made.

Two-cut Technique — The second method is applicable to thinner plate. This consists of a light scoring cut, as described above. A one-pass cut then follows to completely sever the material.

Although much faster than the first method, this way of making the cut is not as accurate. Nor is the cut as smooth. In both instances, a water-soluble oil coolant, which is recirculated and filtered, is used.

Ran Test Series—Allison Div. of American Chain & Cable Co. ran a series of tests on the plate cutter, using their abrasive wheels. Tests were conducted under normal working conditions, and without prior knowledge of the operator. Results of these tests, and conditions under which they were run, are shown in Table 1.

All tests were conducted using an Allison DA46-Q-RH4 wheel. Dimensions of the wheel were 18 x 0.135 x 1 in.

Material tested, in all cases, was Hastelloy Alloy C plate.

Acknowledgement — The author wishes to thank Mr. James Kavalaris of the Campbell Machine Division and R. S. Clemens of the Allison Division, American Chain & Cable Company, Inc., for supplying much of the technical data incorporated into this presentation.

Redesign Adapts Part For Higher-Heat Service

Parts either adapt to meet today's generally stiffer service requirements, or become obsolete. It's the price of progress.

Fabricator's problem is, How readily can an otherwise satisfactory part be adapted? Say, to the need for higher service temperatures?

Here's how one such problem was met—and mastered.

■ You design parts and assemblies to do a job well under a given set of conditions. Then the conditions change. Or sometimes, a more satisfactory way is found for doing the job under the same set of conditions. For the contract fabricator, it adds up to the same thing: Keeping the business means a redesign's in order.

These days, many parts are required to take higher temperatures. Question is, just how much redesigning is called for?

Camloc Fastener Corp., Paramus, N. J., solved one such problem neatly when its customers switched over from producing propeller-driven aircraft to jet planes. The conventional latch fastener it makes for engine cowls was still needed; jet designers continued specifying it for cowl fasteners on the forward end of the engines. But for the exhaust end, they needed a fastener to stand up against 500 to 900°F temperatures.

Only Spec Changed—The higher-temperature requirement was the only specification changed. Strength, size, weight, and assembly techniques were, so far as possible, to stay the same.

Manufacturing methods as well as materials were altered to come up with a redesigned latch calculated to have an infinite service life at temperatures up to 500°F at 3400 lb load.

OLD VS. NEW: Body parts of standard model latch (left) are machined from aluminum alloy. High-temperature model body parts are cast from 17-4 stainless steel bar stock.

Weight increase was only 20 pct —from 0.626 to 0.750 lb.

Two Locking Actions — Both models provide two locking actions: a tension bail loop to keep the engine cowl tightly closed and a traveling pin to absorb shear stresses. Assembly techniques are also the same for both designs. The standard latch mounts with four standard bolts; the high-temperature latch with four high temperature bolts. Ultimate tensile and shear strengths of the new design are equal to those of the old latch at room temperatures. They're well within high-temperature specifications for the new.

Body parts for the standard latch are machined from an aluminum alloy. High temperature metals which might substitute were all considerably heavier. And they were expensive, if not impossible, to machine.

Investment Cast—So body parts were replaced with precision investment castings, made of 17-4 PH stainless steel bar stock. Casting permitted considerably thinner components than the aluminum alloy without loss of strength. To reduce weight even more, the shear pin side of the fastener was further redesigned. Two lightweight parts stamped from thin corrosion-resistant steel strip were substituted for the component, which stopped shear pin travel but had no structural function.

One new part—a bracket—holds shear pin retraction springs. The other is a stop behind the pin.

Spring Problem—Springs were another critical factor in redesign. There are four springs in the assembly: a wire trigger spring, a lever stowage clip spring, a friction washer spring and a pair of wire retraction springs. In the standard fastener, wire springs were made of music wire; washer and clip springs, of heat-treated, high C steel.

The high temperature fastener substitutes 17-7 PH wire and 17-7 PH strip for these critical parts. This material has the necessary spring characteristics and can withstand the repeated heat treatments which jet engine heat entails. Its ability to resist corrosion at high temperatures was a third factor.

GOOD: Wearpact track shows minor wear, no breaks.

POOR: Carbon steel shoe is badly worn and bent.

Steel Castings Shrug Off Wear and Impact Abuse

By C. G. Mickelson—American Steel Foundries, East Chicago, Ind.

Castings of a new alloy steel combine wear and impact resistance to an unusual degree.

They don't bend or break; they wear out slowly and evenly. Then you throw them away.

They've shown their ability to "take" it on some of the roughest work imaginable—real hard-rock mining.

■ Castings made from a new alloy steel show outstanding resistance to both wear and impact on one of the most metal-abusing jobs there is: digging and crushing the flint-hard and highly abrasive taconite iron ores of northern Minnesota.

At the same time, they're chalking up remarkable records in withstanding the rigors of service in removing overburden and iron ore and on heavy earth-moving jobs.

Actual field tests of mining machinery show that American Steel Foundries' new Wearpact alloy doubles and triples service life for such parts as: (1) dipper points on mine shovels and loaders and, (2) shoes for crawler-type tractors. Greatly improved service life has also been obtained on heavy-duty crushers.

Double Trouble—These machinery components take a terrific beating on two counts, wear and impact. The impact alone from large, irregularly shaped pieces of ore has been known to break critical machine parts outright, or else bend them so badly that they've had to be replaced.

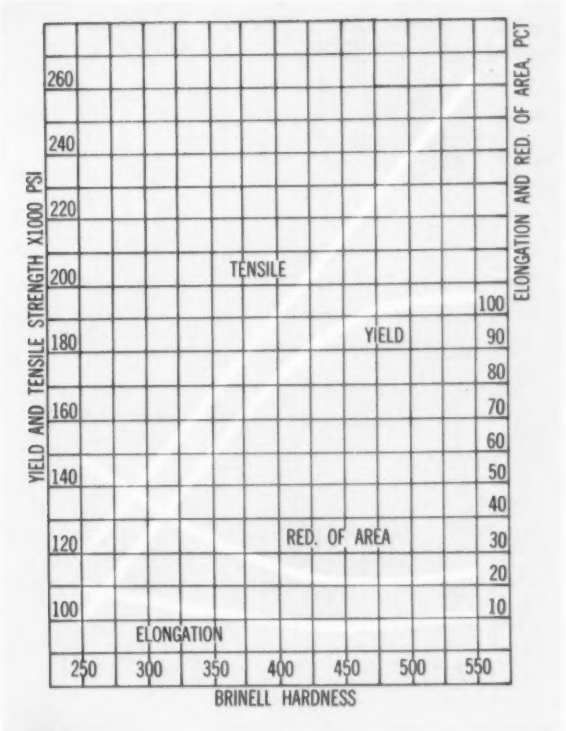
Resurfacing these worn parts or replacing damaged ones is costly, not only in materials but in time lost during equipment shutdowns. Thus it was quite evident that the ideal part for such heavy-duty service would have to wear slowly and evenly while it withstood all efforts to break or bend it. Moreover, the cost of the part should make it more economical to throw it away than to resurface, or otherwise salvage it.

Meets The Test—Wearpact steel seems to meet this challenge admirably. It is in the low-alloy class, containing approximately

0.23-0.33 carbon, 1.30-1.80 manganese, 0.30-0.60 silicon, 0.40-1.00 chromium, 0.40-0.60 molybdenum and 0.50 nickel (max.). It also contains boron and other rare earth elements.

A unique treatment develops the alloy's high strength properties for a uniformly hard, wear-resistant structure. Standard test bars in the 500 Brinell hardness range show these approximate values: tensile strength, 245,000 psi; yield strength, 190,000 psi; elongation, 10 pct; reduction of area, 25 pct; Charpy V-notch impact strength, 22 ft-lb at room temperature and 18 ft-lb at —40°F.

For initial field tests, castings of the alloy were made into dipper points for a small bucket hoe produced by the Link-Belt Speeder Co. Tests of these points, which weigh about 10 lb each, were run with Link-Belt Speeder supervision.



PROPERTIES: Standard test bars of the specially-treated alloy showed these mechanical properties

Positive Proof — Results indicated clearly that the Wearpact points did not break nor bend, and that they remained sharp to the point where they were discarded.

Later tests were made in taconite, iron ore and overburden with larger digging equipment of other manufacture.

Service life in terms of trucks loaded was two to three times as long as points made from other materials, even considering the fact that some of the latter were repointed and resurfaced during the test run.

In another test, a full set of concave sections of the new alloy was installed as a lining for a 42-in. Allis-Chalmers gyratory crusher. About 400,000 tons of taconite were crushed in this unit before the bottom sections needed replacing. At this point, however, the top rows of castings showed such slight wear that they were not removed. But nowhere, even in the sections that were replaced, were there any signs of metal flow or distortion.

Formerly, damage to lining plates made of other materials made it necessary to resize them at intervals by scarfing.

Wear Evenly—A sloping chute under the crusher also receives the full impact from 8-in. chunks of ore as they are ejected. Wearpact liners in the chute lasted more than twice as long as the castings used formerly. Although they were worn to a feather edge from the abrasive action of 400,000 tons of ore, there was no sign of cracking or breaking.

Another field test was made to compare castings of SAE 1045 steel with those of the new alloy for use as track shoes in crawler type tractors. All the shoes in one track of a giant tractor were Wearpact castings; those in the other were plain carbon steel.

Plain To See—After 550 hours of rugged mine service, the alloy castings showed virtually no breakage, wear or distortion. The plain steel shoes showed average wear of 9/16 in. and enough distortion and breakage to require replacement.

After 456 hours of additional service, the alloy shoes were still in excellent condition. The second set of carbon steel castings, however, were again badly worn, bent and broken.

This ability to stand up under severe impact loading means parts can be redesigned to put more metal at points of heaviest wear, without increasing the total amount of metal used.

No Miracles — American Steel Foundries feels that Wearpact alloy castings can serve in many other applications where a combination of wear and impact resistance is required. They make no "cure-all" claims for the new material, but they do point out several additional advantages:

1. The alloy is magnetic. This can be important in crushing or grinding certain ceramic or refractory materials, since abraded iron or steel particles can be removed easily by magnetic means.

2. The alloy can be welded by conventional arc techniques, using proper electrodes and controlled preheating. Extensive welded fabrication is not recommended.

3. In the 477 minimum Bhn range, Wearpact castings can be machined satisfactorily with carbide tooling.

Engineers Face Up to New Challenges

By W. G. Patton—Engineering Editor

The annual SAE meeting in Detroit gave auto industry engineers plenty to think about.

Problems discussed ranged from current personnel headaches to the future of automation.

Speakers also debated two hot topics: forged vs. cast crankshafts, and separate vs. integral frame construction.

■ The auto industry is very much concerned about personnel.

It's not just a shortage of engineers that has the industry worried. It's a lot of personal problems: "How do we select the engineers we want to move up into executive spots? How do we get our men "over the hump" from a minor executive to a top executive? Where will we find the maintenance people we need?"

A survey of manufacturing executives attending this year's SAE meeting at Detroit showed that more than half wanted information on how to prepare engineers for management jobs.

Big Demand—Apparently there's more room just below the top of the personnel pyramid in the auto industry than anybody suspected. At least, it would be hard to escape this conclusion after talking to SAE members at Detroit, Jan. 14 to 18.

The task of improving worker productivity is everybody's problem, it's admitted. Communications, employee training, supervision, worker attitudes and relations with the union are all involved.

There's no ready-made answer to the industry's personnel problem. Nearly everybody seems to agree on this. Perhaps it's a good sign that auto engineers are now looking intensively at problems they never hope to solve with a slide rule. The day when a top engineer is just a good engineer—and nothing more—seems to be disappearing.

Debunks Automation—As usual, the SAE annual meeting produced a number of outstanding papers. Of particular interest to the metalworking industry was one by James R. Bright, Associate Professor, Harvard University, on "Myths and Fallacies of Automation."

Among other things, the author points out that most so-called "automatic factories" turn out to be "remarkable advances in mechanization." A shell factory, for example, reported to be "fully automatic," turns out to use 20 pct less manpower than a conventional plant. "How," he asks, "can it be fully automatic if it uses only 20 pct less manpower?"

No Such Thing—Take another example: Ford's Cleveland Engine Plant has been described as a "Factory That Runs Itself." There are, Mr. Bright points out, 4500 people working in the plant. And there are 2700 workers on the production line. "Is this an automatic plant?" he asks.

Most "automatic plants are not so automatic after all," he concludes.

The author also pinpoints a number of misconceptions about automatic manufacturing. For example, automatic manufacturing requires feedback control. But only a few machines have it. Then, too, many believe the only motive for automation is cost reduction through elimination of labor. Yet one engine plant made a clear gain of 60 to 80 pct in machine utilization.

Cuts Maintenance—Other valid reasons for automation, he points out, are improved quality, easier work, even a reduction in investment and maintenance. The two most automatic plants he studied, for example, actually reduced their maintenance costs.

Mr. Bright also believes the impact of automation on the quality of maintenance skills required may be less than is expected. There is an enormous technical gulf between "automatic" and "fully automatic," the author believes. And unless a machine is *fully* automatic, people are going to be necessary for a long time to come.

What's Ahead—Those at the meeting who wished to peer far down the automation road had plenty of opportunity. A paper titled "A Yardstick For Automation" visualized, among other things, punch presses that automatically position the stock so the maximum number of piece-parts could be stamped out of a minimum amount of stock.

Also seen in the future are (1) a machine tool with a built-in machinability computer, (2) a machine tool that will remove metal at the fastest permissible rate, taking into account the tool, surface speed, other machinability variables and materials.

Rolling Mill "Brain"—Authors of this paper, George H. and Paul S. Amber, Machine Control Consultants, think it's possible to design a steel mill that rolls beams having optimum cross section. Spacing between the rolls would be adjusted by a computer.

The computer would accept span and load factor settings and work these into beam dimensions by solving conventional beam formulas. Using computers to control the mill, the authors say custom beams could be produced as readi-

ly as standard I beams are rolled at present.

These authors also see possibilities for using "controlled catapulting" instead of conveyors and "lofting of parts for three-dimensional positioning." They also think it's possible to "kick" parts across a table for two-dimensional positioning and timing.

Plug Car Frames—Some interesting insights into the current competition between integral frame-body cars and frame-type cars were offered in another paper. Authors S. L. Milliken and J. R. Parker describe the new 1957 Cadillac frame developed jointly by Cadillac and A. O. Smith Corp.

They point out that Cadillac tests of integral body-frame types show no outstanding advantage in weight, height, cost, road noise or interchangeability.

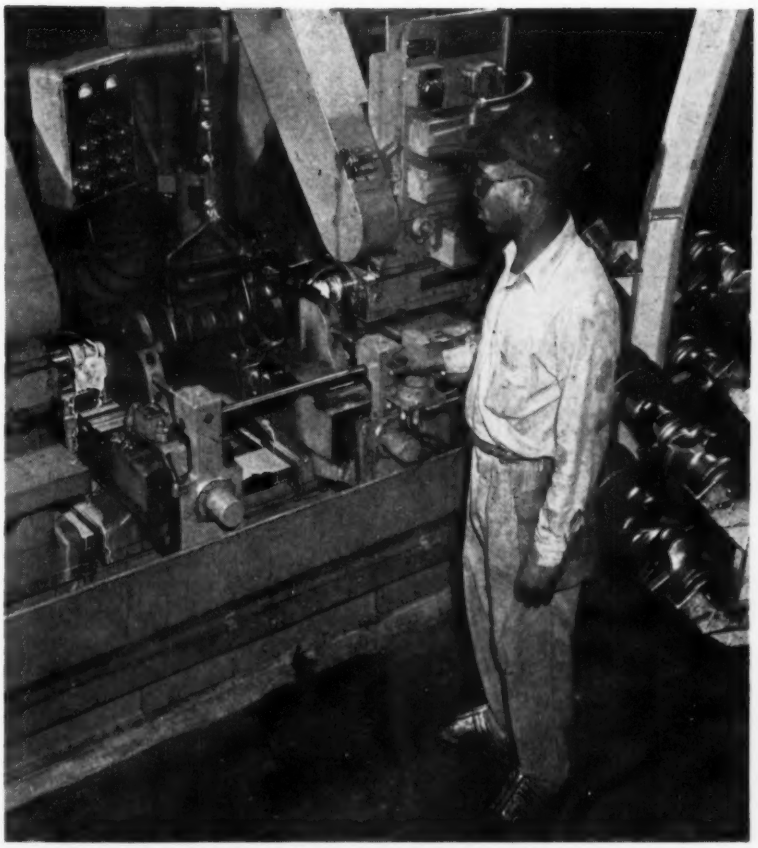
The advantages with integral construction apply only to smaller cars with short wheelbases and where one body is used for a major share of the production over a period of years. They say that integral frame-body designs are not adaptable, economically, to a variety of wheelbases and body styles. On the other hand, separate frame construction makes possible a chassis that can be assembled complete, tested and shipped to a custom body builder or an assembly plant.

Crankshaft Debate — Another controversial subject, cast vs. forged crankshafts, got a hearing at the 1957 Detroit meeting. K. B. Valentine, Assistant Metallurgical Engineer of GM's Pontiac Div., discussed Pontiac's experience with a cast pearlitic malleable crankshaft.

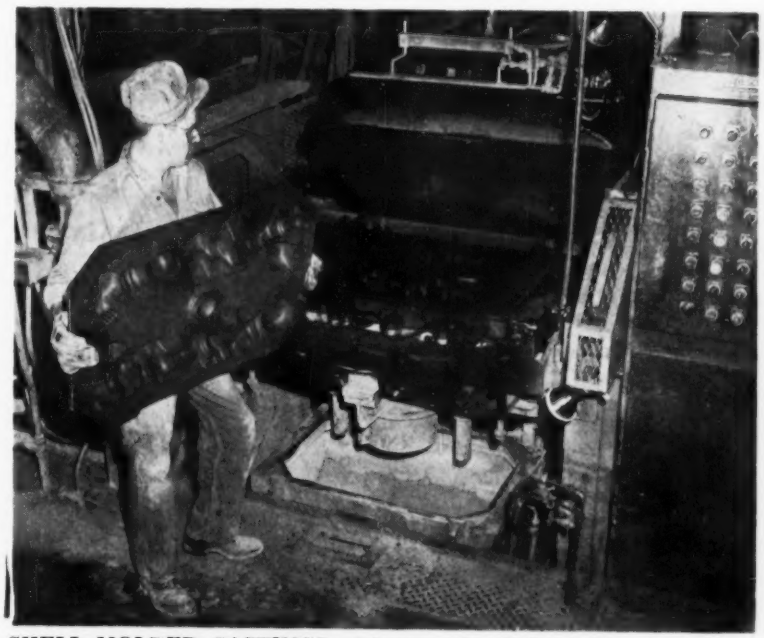
According to Valentine, elastic modulus of the crankshaft iron is in the range 26 to 28 million psi. There is no appreciable difference in pin and journal wear of cast and forged crankshafts.

Pontiac gets 56 pct and 58 pct increases in tool life for two machining operations on cast cranks. Another operation now uses only 6 tools instead of 21.

Formerly, the firm removed 18 lb of metal from its forged crankshaft; only 10 lb are machined from the cast piece.



MANY SAVINGS HERE: Machining these pearlitic malleable crankshafts at GM's Pontiac Div. proves faster and more economical than similar operations on forged steel shafts. The cast product allows speeding up feed rates on several machines, also boosts tool life.



SHELL MOLDED CASTINGS: Advances in shell molding techniques, coupled with developments in bismuth and boron additions to molten iron, contributed to the suitability of cast pearlitic malleable crankshafts. Cast, forged showed little difference in pin and journal wear.

Weld Quality Rides With Steel Selection

By A. C. Ward, Electrode Specialist, Welding Dept., General Electric Co., York, Pa.

No manufacturing method, and certainly not welding, is an island unto itself. Each is influenced by (and influences) other factors.

Steels, even similar analyses, exhibit many differences. Each affects weld quality. The welder must develop an easy familiarity with steels.

For without it, how can he deliver best-quality welds consistent with cost?

■ Welding steels would be lots simpler if all the enormous tonnages turned into fabricated products each year were the same.

There are a number of reasons why they're not. Apart from the fact that American industry needs scores of different chemical analyses, exhibiting a variety of properties, there's the fact that steels are produced by widely scattered plants, by batch process. Fabricating practices further influence final properties.

Result is, you find many differences between steels. And in every case, they'll act to influence the quality of your welds.

Let's look at some of these weld-affecting factors:

Common Steels—First off, steels of accepted commercial compositions satisfy the bulk of industrial applications, and probably your own. These fall within the widely accepted commercial "specs" set by American Iron and Steel Institute, American Society for Testing Materials, and the Society of Automotive Engineers. These are briefly summarized in Table I, together with type of material covered.

But frequently, you'll need steels not completely covered by these standard specifications. You'll then want to write your own, covering some of these points:

Manufacturing Process — Here you'll want to decide, is it basic openhearth, acid openhearth, electric furnace or Bessemer steel that you need? Of these, basic openhearth is the biggest tonnage producer. It makes both carbon and alloy steels of a moderately clean, good grade. Acid openhearth process is usually used only for killed (carbon) steels. Electric furnaces make the best quality alloy and tool steels, but at higher production costs.

The Bessemer process is a fast, low-cost method for turning out steels satisfactory for screw stock, reinforcing bar, skelp for welded pipe, sheet and strip. It produces about 4 pct of our steel.

Deoxidizing Practice — Carbon steels can be furnished either killed, semi-killed or as rimming steel.

Generally, all steels of 0.25 pct carbon and above are killed. That is to say, they are degassified and deoxidized before solidification so that they are free from blowholes and segregations. Some structural steels (those ranging in carbon content from 0.15 to 0.25 pct C) are also supplied killed.

Semi-killed steel is only partially deoxidized before casting. It lies about midway between killed and rimming steel, and contains some blowholes and some piping. Structural steels such as plates, rail steel and forgings which are not furnished fully killed are generally supplied semi-killed.

Rimming steel is only partially deoxidized. That is, it is cast with very little degasification, but with elements such as carbon and silicon kept very low. This clean, low carbon (below 0.15 pct C) steel is used in making electrodes.

Properties—Important strength properties are generally specified. They may include tensile, fatigue or impact strength. Elongation or reduction of area, bending or other tests, or hardness values—where machinability counts—may also be specified. Sometimes, hardenability, grain size or other special checks such as magniflux-

TABLE I

Equivalent Material Standards For 0.15 Pct C Steel

Agency	Spec. Designation	Scope of Specification
American Iron & Steel Inst. AISI	AISI C 1015	Ferrous Materials
American Society for Testing Materials ASTM	ASTM A7-42	Engineering Materials
Society of Automotive Engineers SAE	SAE 1015	Materials for Automobiles
AMS	AMS 5060 SAE	Materials for Aircraft
	Aeronautical Material Spec.	

ing will be asked for as well.

Normally, though, close to 90 pct of the steel industry consumes is of the simple openhearth, carbon-steel variety covered by materials standards published by AISI, ASTM, SAE, or AMS.

It's not surprising, then, that a proportionate amount of the arc-welding electrodes sold (by pounds) are AWS standard mild steel electrodes. Industry uses some 5 lb for every ton of steel produced.

How Finished? — Rolling practice followed by the mills in making sheets, shapes and plates are another important factor. In fact, from a welding point of view, these hot-rolling and cold-working practices make probably the most important difference on the physical properties of the materials. Effects of these practices on a standard AISI C-1025 steel having the same chemical analysis in both the hot-rolled and cold-worked condition are shown in Table 2.

Note that cold-working produces substantial gains in tensile and yield strength and in hardness.

Select Accordingly — These differences in mechanical properties on low carbon steels (0.10 to 0.25 pct C) may influence your selection of an arc-welding electrode. For the steels shown, an E-6010 electrode would most nearly match the mechanical properties of the hot-rolled steel. An E-6012 would pair up well with the mechanical properties of the cold-worked material.

TABLE II — How Cold-working Affects Properties of a Standard AISI C-1025 Steel

	Hot-Rolled	Cold-Worked
Tensile Strength	70,000 psi	80,000 psi
Yield	45,000 psi	69,000 psi
Elongation	31 pct	18 pct
Reduction of Area	58 pct	48 pct
Hardness (Bhn)	143	162

Since openhearth practice is far and away the biggest tonnage producer, let's consider it more closely. The great volume of openhearth steel consumed by industry divides into one of three major classes: Low carbon (0.10 to 0.25 pct C), medium carbon (0.30 to 0.45 pct C) and high carbon (0.55 to 0.95 pct C) steels.

Here's how each of these major classes breaks down:

Low Carbon Steels—These are the most widely used steels, and include the common structural materials. They can be furnished killed or rimmed. They're tough, but relatively weak, though their strength, hardness and machinability can be improved by proper cold-working practice.

Generally, increasing the manganese content of low carbon steels improves their machinability and hardening characteristics, while boosting their carbon content brings yield and tensile strengths up. The higher the carbon content, however, the lower the workability of these steels becomes.

These steels weld easily by all commercial welding procedures, with welds of extremely high quality. Usually the mechanical properties of the weld metal will match or exceed the mechanical properties of the base plate. Any AWS mild steel electrode can usually be used in joining these low-carbon steels.

Medium Carbon Steels—The medium carbons are usually what you'll use for carburizing or heat treatment applications. Analyses in this range are frequently used for plain carbon forgings.

These steels weld easily by all commercial processes providing you preheat and, sometimes, postheat. But they'll frequently crack during or shortly after welding.

TABLE III — Here are representative analyses and properties for typical low, medium and high carbon steels.

	C 1010		C 1030		C 1060*		
Carbon	.08–.13		.28–.34		.55–.65		
Manganese	.30–.50		.60–.90		.60–.90		
Phosphorus (max.)	.040		.040		.040		
Sulphur (max.)	.050		.050		.050		
	Hot-Rolled	Cold-Worked	Hot-Rolled	Cold-Worked	Annealed	Hardened and Hot-Rolled	Hardened and Tempered
Tensile Strength	51,000	56,000	80,000	85,000	105,000	116,000	160,000
Yield Strength	29,000	33,000	50,000	72,000	54,000	70,000	112,000
Elongation	38 pct	35 pct	30 pct	26 pct	20 pct	17 pct	12 pct
Reduction of Area	70 pct	65 pct	56 pct	51 pct	44 pct	36 pct	40 pct
Hardness (Bhn)	101	113	163	179	192	241	321

* Cannot be satisfactorily cold worked.

The new electrodes appear a good bet to solve many welding problems resulting from higher carbon content in steels

when temperature is not controlled or when unusual stresses are present. You can frequently weld these using mild steel electrodes without preheat if conditions are favorable.

Control heat imput and losses and you can generally use low hydrogen electrodes to weld these steels without cracking. The new electrodes appear a good bet to solve many of the welding problems occurring in these steels as a result of their higher carbon content.

High Carbon Steels—Normally, high carbon steels are quite difficult to weld, and resulting welds are only moderately satisfactory at that. They're generally used where high hardenability is important, as in hand tools, agricultural machinery, heavy machine parts and springs.

You'll usually have to be careful with preheat, control of distortion and postheat on these steels. Tempering temperature of these steels is approximately in the 400 to 1300°F range. A preheat approching 400°F is therefore helpful in keeping down cracking difficulties which occur when these steels chill too rapidly following welding operations.

Table 3 shows representative chemical analyses and properties for typical low, medium and high carbon steels.

Postscript on methods—A final word about steelmaking methods. Both the openhearth and Bessemer processes can make steels by either the acid or basic (alkaline) technique, depending on the type of furnace lining and slag employed. The difference is, the basic technique can burn or flux out phosphorus and sulphur to low levels, and so usually results in a good weldable grade of steel.

The acid-lined furnaces, on the other hand, are not capable of removing phosphorous and sulphur from molten materials. So these furnaces must be charged with either a very good grade of ore or with scrap and pig iron known to have low phosphorous and sulphur contents. Otherwise a good weldable grade of steel is not produced.

Since most steel is made directly from iron ore having relatively high sulphur and phosphorus contents, it's logical that most American steel is made by basic openhearth process.

May Mean Trouble—Bessemer steel is usually made with the acid technique, and may or may not be readily weldable. This depends on the quality of the charge of scrap and/or pig iron put into the converter. The process burns out silicon, manganese and carbon in that order, leaving these elements low but sulphur and phosphorus all but untouched. Generally "acid Bessemer steel" means welding trouble.

With the foregoing in mind, it's easy to see why both acid and basic slags, or combinations of them, are used in electrode manufacture.

Bear in mind, though, that electrodes use a good grade of rimmed, basic openhearth core wire, so the bulk of the fluxing action needed occurs either on the coating materials or the base plate diluted into the weld. Some feel that lime-coated electrodes have superior fluxing actions on phosphorus and sulphur in steels where these can constitute a problem.

THE LARGER VIEW: A sound basic knowledge of steels and how they affect welding quality is the underpinning on which good weld practice rests. Here, welders join boxcar structural members.

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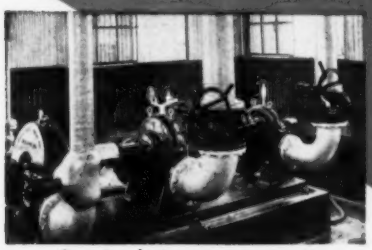
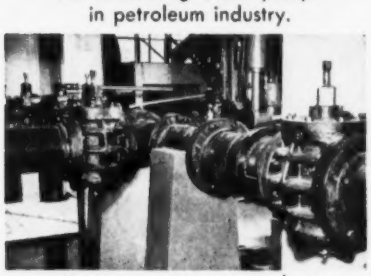


On circulating water pumps in petroleum industry.



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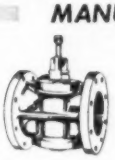

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New Technical Literature:

Catalogs and Bulletins

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A 12-page guide makes short work of electric motor selection. First, the reader selects from tables the kind of equipment or machinery to be driven. Then he identifies the load, operation speed, starting and running torques, surrounding atmosphere, frame type, and speed. In a few moments, the reader knows the motor type he needs, dimensions, etc. *Century Electric Co.*

For free copy circle No. 1 on postcard, p. 113

Tube cut-off unit

Continuous, automatic tube cut-off machines are covered in a 4-page folder. These units make up to 6500 cutoffs an hour. The literature tells how they work, pictures operations, and lists space requirements. *Grieder Industries, Inc.*

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Weld flux crusher

"Better Testing and Small Scale Reduction," describes crushers used to reclaim fused welding flux for reuse. Capacities range from 600 to 2000 lb per hour. *American Pulverizer Co.*

For free copy circle No. 3 on postcard, p. 113

Metal cutting

Development of a new method for straight line and shape cutting non-ferrous metals is detailed in a new 24-page pamphlet. The method employs standard welding equipment for manual and machine cutting. It particularly adapts to high-speed cutting and shaping plates and parts to be joined by gas-shielded arc welding. Cut edges produced usually require no further processing prior to welding. *Air Reduction Sales Co.*

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FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 113.

Used machine tools

How to buy a used machine tool is told in a primer for the used machinery buyer. Written in question and answer form, it covers most aspects of used machinery purchase. *S & S Machinery Co.*

For free copy circle No. 5 on postcard, p. 113

Die casting machines

Die casting machines are depicted in an 8-page brochure. It shows hot chamber and cold chamber units. The former cast zinc, lead or tin; the latter, aluminum, brass and magnesium. *The Cleveland Automatic Machine Co.*

For free copy circle No. 6 on postcard, p. 113

Contour profiler

High speed contouring, pocketing and swarf cutting of aluminum, titanium and steel with a new profiler is described in an 8-page bulletin. *Arrow Engineering Co., Inc.*

For free copy circle No. 7 on postcard, p. 113

Thin-wall tubing

Teflon thin-walled tubing is the subject of a 2-page bulletin. It stresses the material's excellent electrical properties. Also resistant to chemical attack, the tubing comes in sizes from $\frac{1}{8}$-in. ID to 4-in. diam. The bulletin charts diameters, wall thicknesses and tolerances, and weights of standard sizes. *Haveg Industries, Inc.*

For free copy circle No. 8 on postcard, p. 113

Ball Bearings

Ball bearing equipment for screw conveyors is featured in a 6-page folder. These components feature low starting friction and free-rolling action. They result in low horsepower requirements and low maintenance costs. *Link-Belt Co.*

For free copy circle No. 9 on postcard, p. 113

Quenching methods

Modern quenching techniques are discussed in an 8-page publication. It illustrates various quenching media and temperature ranges essential to selection of suitable processes. *Surface Combustion Corp.*

For free copy circle No. 10 on postcard, p. 113

Bronze valves

Solder end and silver-braze end bronze valves in gate, globe and check designs are listed in a 4-page publication. Also included are physical characteristics and construction details. *R-P & C Valve Div., American Chain & Cable Co., Inc.*

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Radiation gage

A date sheet describes the new Curtiss-Wright radiation gage used with an electronic strip chart recorder. It makes continuous non-contact measurement of the weight per unit area of sheet materials. *Industrial Div., Minneapolis-Honeywell Regulator Co.*

For free copy circle No. 12 on postcard, p. 113

X-ray apparatus

Industrial X-ray apparatus is outlined in a pair of data sheets. The equipment includes a twin unit of 150-kv constant potential generators (one anode and one cathode), a pedestal type control, a bipolar X-ray tube and HT cables, an oil cooler and a tubestand. Also covered, is a new unit consisting of a single-pole short anode X-ray tube with a rating of 150-kv, 2 to 20 MA. This model comes in single or double heavy duty focal spot sizes, or fractional focal spot sizes, and a hollow anode X-ray tube for 360° circumferential radiation. *Mitchell Radiation Products Corp.*

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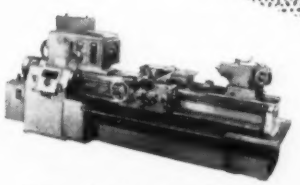

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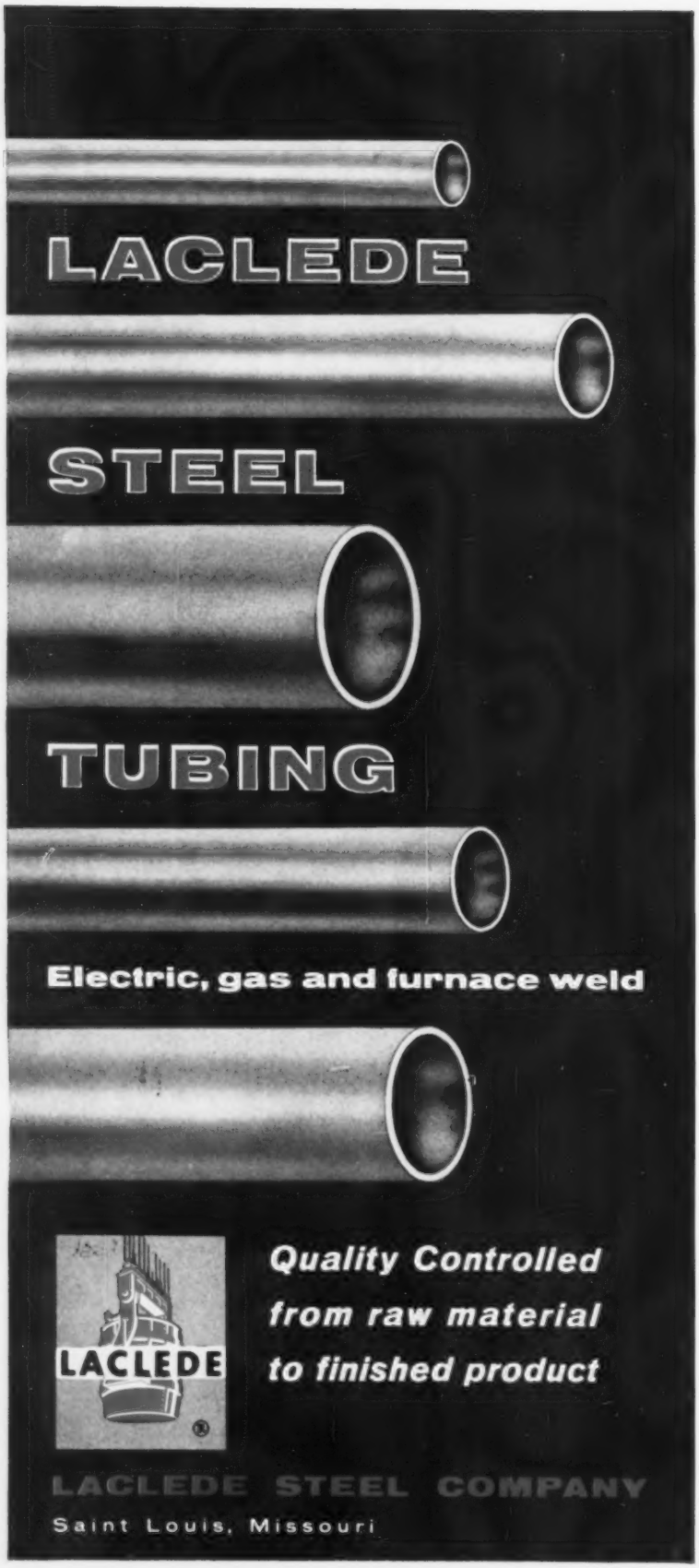

Drill press

A 4-page bulletin describes a 15-inch drill press. It lists specifications for 40 different models of the new tool. It comes in bench or floor models, high or slow speed, Morse taper or key chuck spindle, single or multiple spindles, and standard or production table models. *Delta Power Tool Div., Rockwell Mfg. Co.*

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Sheaves

One and two-groove sheaves for quick and easy speed adjustment of V-belt drives in A and B sections are the subjects of a 4-page folder. Designed for low horsepower applications, the sheaves provide for increased maximum design horsepower. *Allis-Chalmers Mfg. Co.*

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Pumps

Continuous pressure, constant displacement, heavy duty, fluid power pumps are covered in a new bulletin. The four-page publication introduces a new purolator-type micronic filter. *The Oilgear Co.*

For free copy circle No. 16 on postcard, p. 113

Tube fittings

Triple lock tube fittings are presented in a 52-page catalog. Made in brass, steel, stainless steel, and aluminum, they come in all shapes. This includes swivel nut types and straight threaded fittings with O-rings for the new SAE straight thread boss. *Parker Appliance Co.*

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Nut hardness

An original method of identifying Rockwell hardness of 12-point and hexagon self-locking nuts appears in a catalog. It uses code letters A, B and C. These designate Rockwell C19 to C25 as A, C26 to C32 as B, and C32 to C36 as C. The simplified setup speeds ordering and permits visual identity of hardness and material by merely stamping the letter "A," "B," or "C" on the nut. *Boots Aircraft Nut Corp.*

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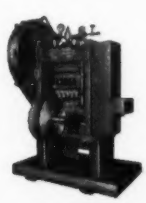
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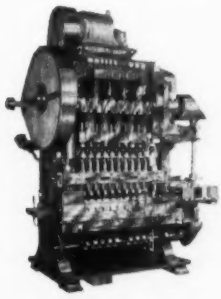
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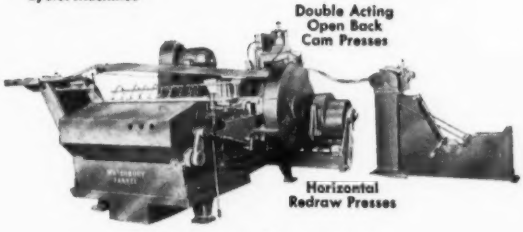
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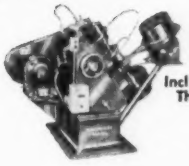
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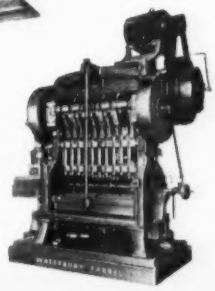
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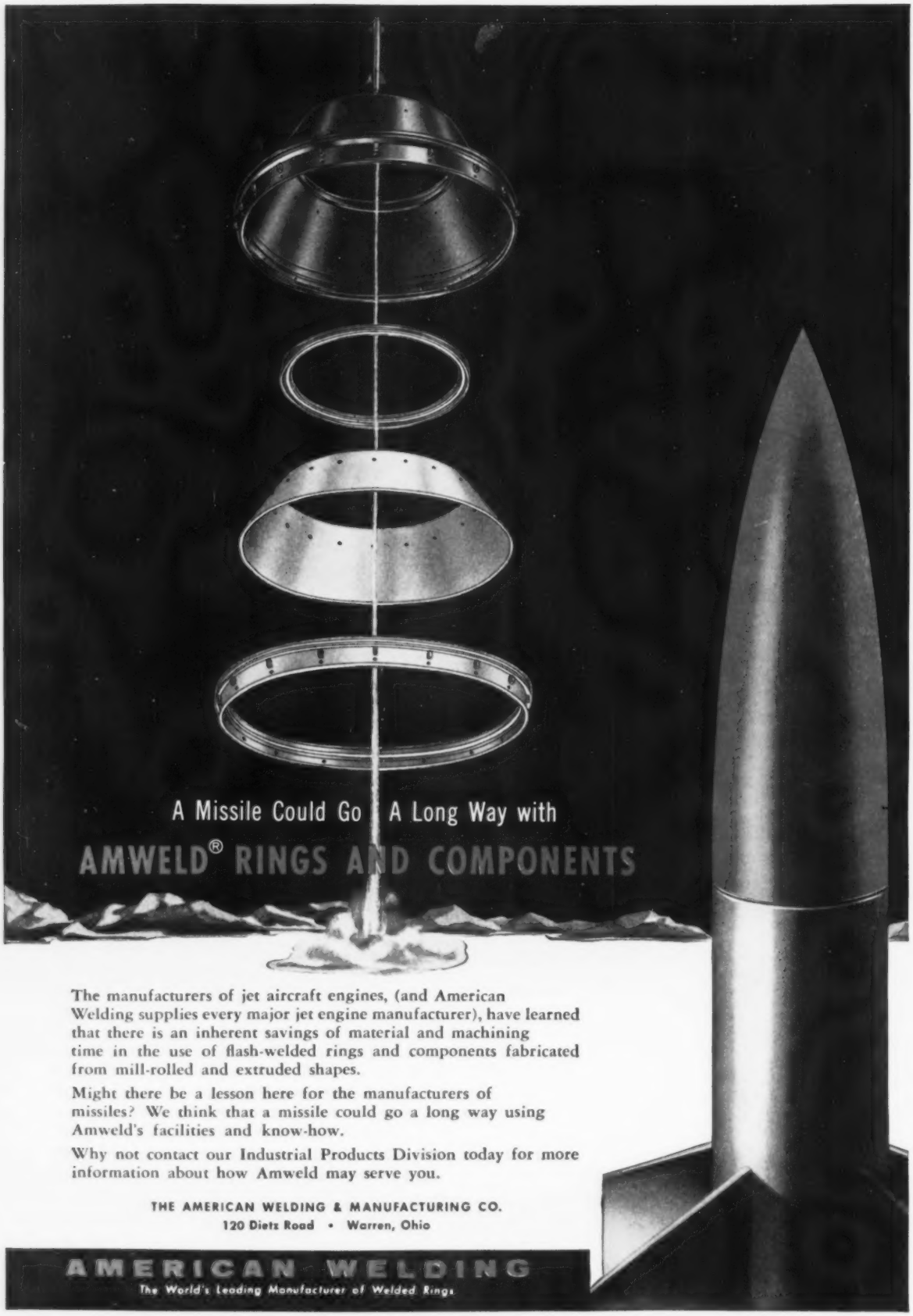

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This section starts on p. 108.

Abrasives

Rubberized abrasives are listed in an 8-page catalog. It covers wheels, points, blocks, sticks and cones. These will smooth, polish, deburr, clean, blend, lapp, and trim. *Cratex Mfg. Co.*

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Puller-hoister

A data sheet introduces a new, lightweight, heavy-duty wire-rope puller. It weighs only 10½ lb and pulls 1000 lb. *Griphoist, Inc.*

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Portable X-ray unit

Portable industrial X-ray equipment for radiographic inspection of castings, welds and assemblies are presented in a folder. It discusses protection features against overload, high voltage, excessive voltage and excessive temperature. *Mitchell Radiation Products Corp.*

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Sheet metal units

Power operated machines for light sheet metal work are pictured in a 20-page pamphlet. The vest-pocket catalog provides quick reference to all principal models. *Niagara Machine & Tool Works.*

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Tools, holders

Tool holders and throw-away inserts are cataloged in a new publication. The 12-page catalog contains tables, photographs and drawings. *Allegheny Ludlum Steel Corp.*

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Electric furnace fumes

Preventing atmospheric pollution caused by fumes from electric steel melting furnaces is discussed in a bulletin. It includes: (1) a general discussion of cloth filtration for cleaning electric furnace ventilation air and (2) nine photographs of actual installations, showing the effect. Photos show furnaces, hooding, duct work, and fume collectors. *Wheelabrator Corp.*

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Cyclic lubricators

Cyclic-type automatic lubricators driven by the machines they operate are covered in a 2-page instruction sheet. This lubricator consists of a piston pump and reservoir. It is pre-set by the machine manufacturer for best operation, and can adapt to a wide range of metalworking machinery. *Bijur Lubricating Corp.*

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Seaway, tugboats

Articles on St. Lawrence Seaway construction and power projects and two new tugboats rated as this country's most powerful are features of a company publication. Also presented in the 26-page issue are stories on a new ammonia plant and large electric generating facilities. *ALCO Products, Inc.*

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Thermostats

Outdoor thermostat control systems are reviewed in a 4-page bulletin. It describes its operation and illustrates components. *General Electric Co.*

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State .....

Smoke breaker

Guaranteed to remove all visible smoke and virtually all odor, a new electrical smoke precipitator is discussed in a 6-page folder. It adapts to almost any industrial use, and requires no special power plant. One man operates it. *Summer & Co.*

For free copy circle No. 28 on postcard

Quick-change coupler

Now you can pump pressures up to 1000-psi in portable aluminum pipelines. A 4-page folder tells how to do this by using a fast-move coupler. The coupler has no loose or moving parts; it provides positive gasket sealing and fits practically any aluminum tube or pipe. The folder describes time savings resulting from using them. *John Bean Div., Food Machinery & Chemical Corp.*

For free copy circle No. 29 on postcard

Switches

How switches count thousands of items daily is told in a 4-page publication. It also contains data on switches that "play checkers" on valves and wire. Switches that straighten stacked sheets, grease bearings and hoist boats are illustrated. *Microswitch Div., Minneapolis-Honeywell Regulator Co.*

For free copy circle No. 30 on postcard

Magnets, thermistors

Information on permanent magnets, thermistors and thyrite varistors is included in "Trend and Developments for Electrical Design Engineers," just released. Containing a dozen pages, the publication has four sections. It discusses the subjects in relation to a designer's problems. The booklet points out new approaches, possibilities and methods for using the products. How magnets help designers miniaturize products, determining the proper magnet for a specific application, how thermistors and thyrite varistors can be "harnessed" for your products, are among some of the subjects covered in the publication. *G. E. Metallurgical Products Dept.*

For free copy circle No. 31 on postcard

Solid lubricant

Solid film lubricants are covered in a brochure. It describes a mixture of micronic size lubricating particles (graphite, moly disulfide, and sometimes bearing metals) with a low coefficient of friction, in a thermosetting resin. *Electrofilm, Inc.*

For free copy circle No. 32 on postcard

Hook scale

Hook scales that work without friction are the subject of a 4-page folder. It pictures the units in action on several jobs. These include weighing: bar stock in a receiving department, billets in a forge works, molten steel in a foundry and equipment on a fork truck. *Martin-Decker Corp.*

For free copy circle No. 33 on postcard

Deburring, chamfering

Single-station units for deburring and chamfering medium to large hypoid pinions with short or long shafts is described in a bulletin. It handles pinions of 8-15 teeth with range of 3¼ to 8-in. OD and with shaft lengths up to 15 in. *Modern Industrial Engineering Co.*

For free copy circle No. 34 on postcard

Oxygen analyzer

For process-plant use, an oxygen analyzer uses a colorimetric differential-photometer method for continuous detection and measurement of trace amounts of oxygen in gas streams. A data sheet generally describes the equipment and gives its applications. *Consolidated Electrodynamics Corp.*

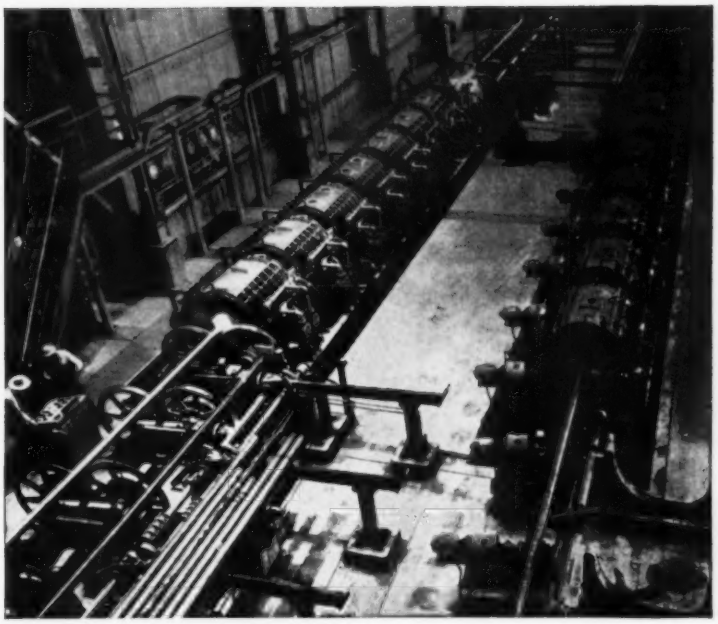
For free copy circle No. 35 on postcard

Damp-wall paint

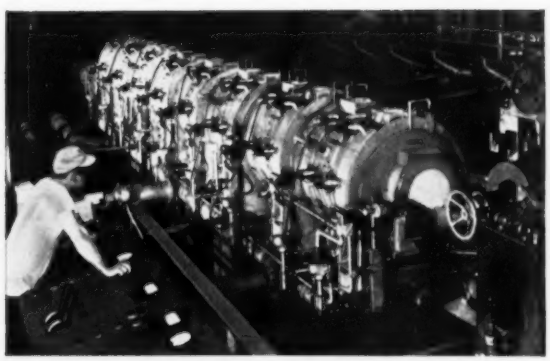
You can now paint damp walls. A new folder tells you how. It outlines not only the solution of this problem but many others. Such problems include protection from fumes and chemical spillage, fungus resistant coatings without the use of toxic additives, and odor free products which can be applied during working hours, in order to eliminate shutdowns or overtime. *The Wilbur & Williams Co.*

For free copy circle No. 36 on postcard

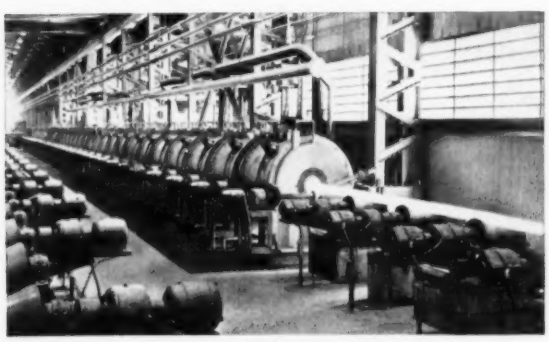
Selas Barrel-Furnace Lines Heat Treat Tubes and Bars . . . in Continuous Operations at Mill Speeds



Continuous hardening and tempering seamless tubes at Colorado Fuel and Iron.



Heating for sizing the heaviest wall seamless tubing produced in the U. S., at Phoenix Iron and Steel.



Normalizing welded tubing in 66 sec . . . compared with conventional practice of 21 min . . . helps Lone Star Steel turn out an improved product, faster.

steel companies use Selas Gradiation® Heating in specially designed barrel-furnace lines to do a wide variety of heat processing . . . to keep pace with high production demands

Selas barrel-furnace lines throughout the steel industry perform their heating jobs as part of in-line continuous production operations, automatically controlled. The compact, space-saving, gas-fired furnaces deliver uniform heating with speed and precision.

Send for informative articles on Selas tube and bar heating installations. Address Dept. 13.

SELAS
CORPORATION OF AMERICA
DRESHER, PENNSYLVANIA

Heat and Fluid Processing Engineers
DEVELOPMENT • DESIGN • CONSTRUCTION

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PLANT LOCATION FACTS

Pin-pointing your markets . . . present and potential

New York State is the world's greatest market. And it is adjacent to other major markets.

If being close to your markets is a major factor in your plant site analysis, you will want complete marketing facts on which to base your locational decision. Supplying such facts is our business.

For consumer goods, we will provide the data with which you can appraise markets that can be reached competitively from any specific location in New York State. If your customers are industrial, we will provide you with summaries of types, size and distribution of the industries in which you are interested within the New York State marketing area.

Markets won't be your only problem in deciding on a new plant location. You will want complete facts on labor, water, available sites or buildings, power, fuel, transportation and raw materials. And you will want information on these as they apply to the successful operation of a specific plant.

A tailor-made report

Any or all of the factors important to your consideration will be covered in a confidential report to you—tailored to your needs. It will be prepared by a professional and experienced staff to cover either New York State locations of your choice, or, if you wish, sites which we will select on the basis of your needs.

Our booklet, "Industrial Location Services," explains what we can do for you. To get your free copy, write me at the New York State Department of Commerce, Room 664, 112 State Street, Albany 7, N. Y.

Edward T. Dickinson

EDWARD T. DICKINSON
COMMISSIONER OF COMMERCE

INSTRUMENTS: Annealing

Instrumentation improves to keep pace as high speed strip annealing lines get faster and faster . . . Many recorders and controllers work 24 hours a day, seven days a week.

As strip annealing lines get faster and faster, instruments must get better and better. An example of this is operations at Dominion Foundries & Steel, Ltd., Hamilton, Ohio. Here, strip annealing takes place at 1000-fpm.

Cleaning Removes Oils

The continuous annealing line heats, soaks and cools strip at a rapid rate 24 hours a day, seven days a week. After cold rolling, coils of low carbon steel are hard; their surfaces contain a coating of rolling oils. Hence, they must be cleaned and annealed prior to tinning.

Cleaning the strip removes the rolling lubricants. Annealing restores ductility. By varying the soaking heat and time and the cooling speed, the line achieves various degrees of softness. The continuous line does all this, unwinds and rewinds the coils, at the 1000-fpm rate.

A battery of 26 instruments hold temperatures of the pre-heat, heating and soaking zones within narrow limits. Six of these are round chart two-position recording controllers. These regulate temperature of the pre-heat zones. To hold heating and soaking zones at desired temperatures, 19 round chart, current-adjusting type recording controllers supply dc signals to saturate core reactors. These regulate electric power input.

Operator Checks Indicator

An indicator permits an operator to check manually 30 thermocouple points throughout the furnace from one location.

Additional devices include a recorder for measuring strip temperatures as it enters and leaves the soaking zone; a second measures strip speed. A triple-action position-adjusting type recording controller regulates actual strip temperature in the critical section of the cooling zone. This works in combination with six single-action position-adjusting-type relays.

WANT MORE DATA?

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Operator adjusts heat control on instrument panel.

Rated production of the furnace used at Dominion Foundries & Steel, Ltd., is 30 ton an hour on 0.010-in. x 30-in. wide strip at 1000- fpm.

The strip annealing line was built by Drever Co., Bethayres, Pa. Speedomax instruments used are products of Leeds & Northrup Co., Philadelphia.

Management:

Figuring how to boost capacity is a cinch?

Almost anybody with experience in industry can figure out how to increase manufacturing capacity. This is the thought of management men at Tube Turns Div., National Cylinder Gas Co., Louisville, Ky.

Last Word Is Trick

The trick is to come up with facilities that represent the last word in efficiency, and to get the most for the investment entailed. At Tube Turns, where the company is doubling the site of its main plant, employees evolve expansion plans in a series of brainstorming sessions.

The term "brainstorming" describes a group creative thinking process. It was coined by Alex Osborne of Batten, Barton, Durstine & Osborne, Inc., New York City.

In the brainstorming meetings a plant layout board with proposed buildings and machines scaled to a quarter of an inch is available for inspection. The firm urges participants to let their imaginations soar. All ideas are welcome and criticism is barred. Afterward, evaluators kick the ideas around; they then turn over the many good ones to the company's management and engineering staffs.

In eighteen brainstorming sessions, employees have submitted a total of 799 ideas, many of which are being adopted.

Tube Turns manufactures welding fittings and flanges for industrial piping systems.

Handling:

Experts suggest only 10 standard pallets.

Reduction of pallet sizes from the hundreds now in general use to 10 standard sizes is suggested by a committee of widely known industrial and materials handling specialists.

A tentative draft resulted from their prolonged study of pallets

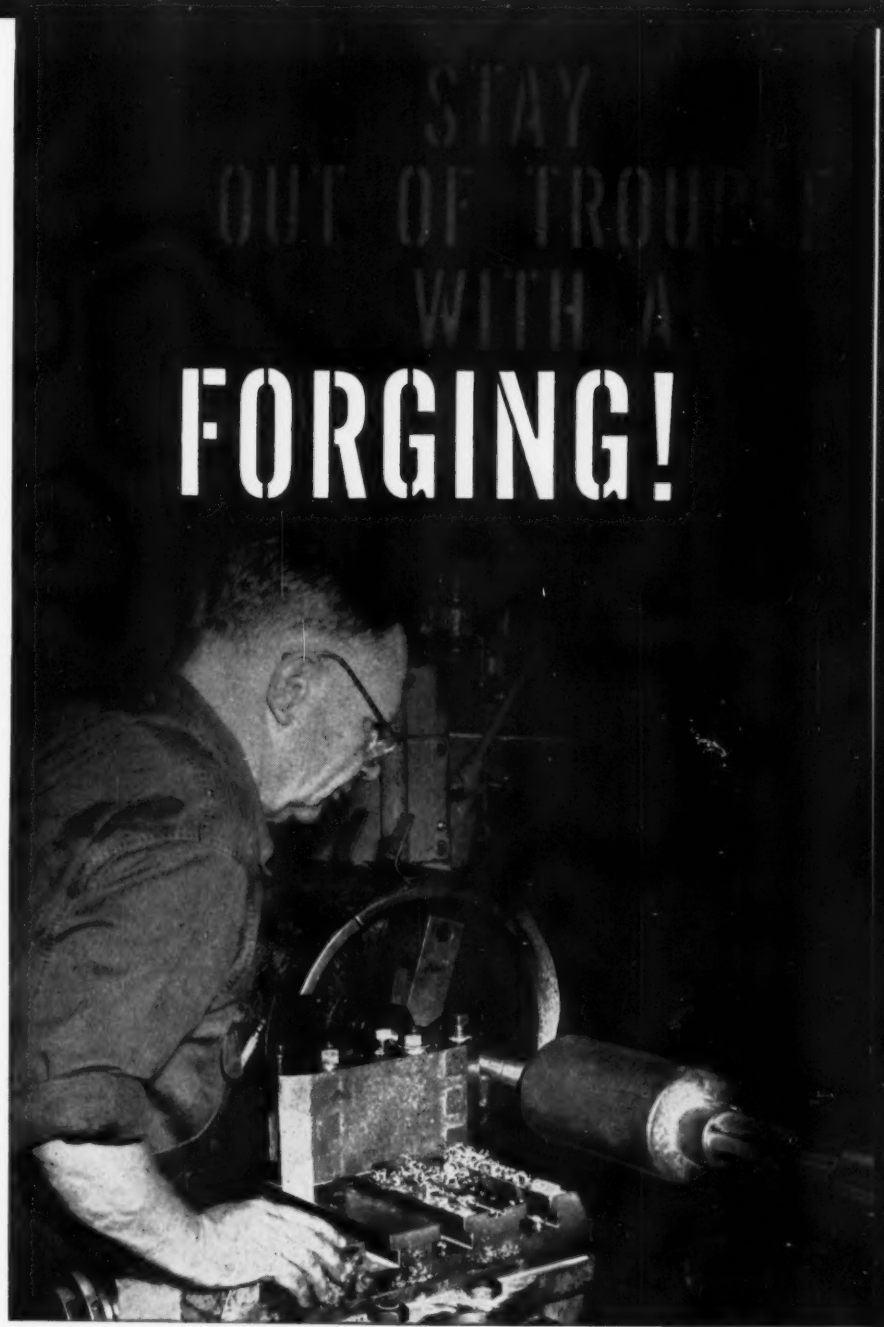

PHOTO - COURTESY CLEVELAND WORM AND GEAR CO.

The part illustrated above *will* become a component of the completed product — will *not* become a reject — BECAUSE IT IS A FORGING.

You get effective machinability because forgings are dense, homogenous metal, free of porosity and other flaws. Forgings start with *forging quality metal* which is improved by the forging process. This fact also offers advantages in heat treating and welding.

If you are experiencing a costly reject rate, find out how *forgings will help you.* Call in a forging engineer, and also send for the booklets offered below to learn the economies that can be gained by the use of forgings in your product.

Reduce your cost by using forgings. Send for booklets, ☐ "What is a Forging?" and ☐ "Management Guide to the Use of Forgings."

closed-die **forgings** for metal you can trust

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TECHNICAL BRIEFS

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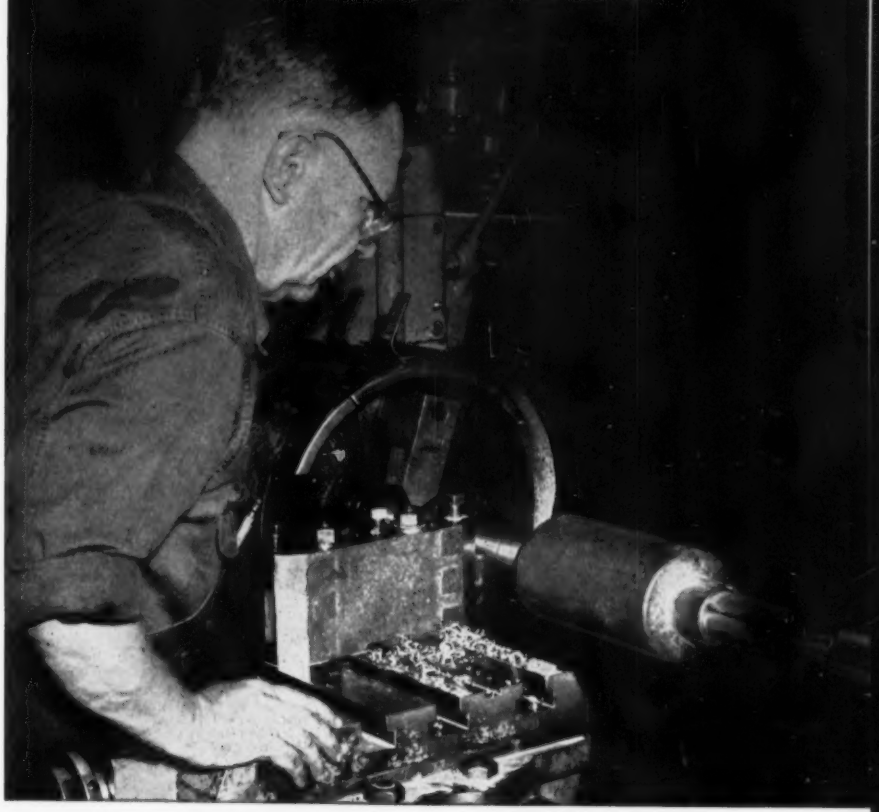
STAY OUT OF TROUBLE WITH A

FORGING!



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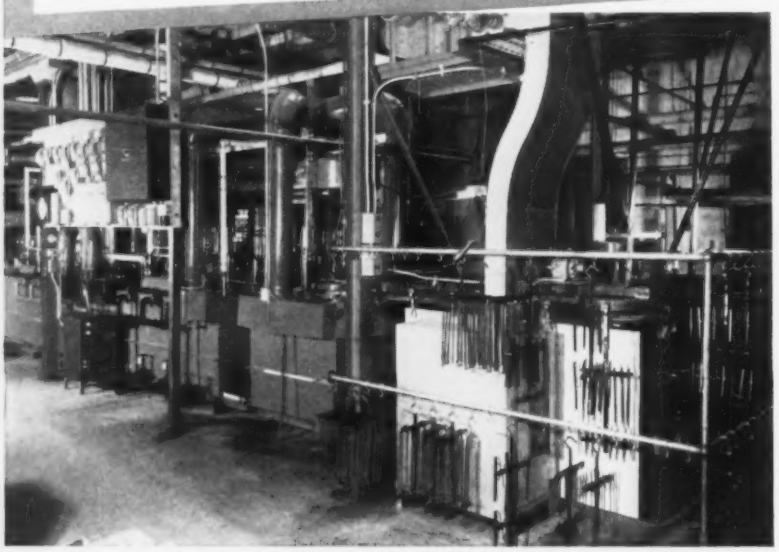
A BRIGHT FUTURE IN MUSIC STANDS WITH UDYLITE HI-C BRIGHT NICKEL



Krauth and Benninghofen, of Hamilton, Ohio, has been making music stands for almost a hundred years. Now a third generation continues the operations making about 99 percent of all the music stands sold in the United States.

Last year Udylite Bright Nickel 514H, the high chloride, high speed process, with a bright chrome overlay replaced the single step gray nickel which had long been the standard music stand finish. The sales appeal of the bright nickel bright chrome finish forced higher production to meet the 20 per cent sales increase.

The operation of a Udylite high production Full Automatic Plating Machine enables these people to apply the new double process finish with precision and to get this better appearance and better corrosion resistance *at lower unit cost.*

Update *your* finish, *your* production and *your* costs with all of the advantages of Udylite Processes and Equipment.

THE Udylite CORPORATION DETROIT 11, MICHIGAN

WORLD'S LARGEST PLATING SUPPLIER

as related to transportation facilities, mechanical materials handling equipment, requirements of in-plant materials handling, and other factors.

Organizations Offering Copies

The study was co-sponsored by the Society of Industrial Packaging and Materials Handling Engineers and the American Society of Mechanical Engineers in accordance with procedures of the American Standards Association.

Single copies of the formally printed "tentative draft" for "Proposed American Standard Pallet Sizes" are available through the Society of Industrial Packaging and Materials Handling Engineers, 111 W. Jackson Blvd., Chicago 4, Ill.

Machining:

Technique grinds parts to within 0.00010 in.

Precision grinding techniques now make it possible to match vital aircraft servo valve pistons and cylinders within 0.00010-in. accuracy.

Use of the new method has stepped up production rates as much as double on servo valves for Chance Vought jet aircraft, they report. Overall costs have also been cut.

The servo valve has two basic parts: the cylinder or sleeve and the piston or slider.

Precision machined ports in the sleeve and "lands" on the surface of the slider must be perfectly matched to specifications. Past experience on similar jobs indicated that the precision forming and matching of these two parts was the most critical factor in their production.

Some Attempts Fail

Previous attempts to produce interchangeable parts were not fully successful. Rejects were high and the amount of regrinding required on both parts proved prohibitively high in cost.

Working closely with Chance Vought process technicians, metrol-

this man is saving his company money...

MAINTAINING EQUIPMENT AT TOP EFFICIENCY

HYPRESSURE Jenny WILL SAVE YOUR COMPANY MONEY... Cleaning

As you can see, he's cleaning a lift truck with Hypressure JENNY Steam Cleaner. He could be stripping away accumulated oil and grease, to inspect and repaint.

Or he may be cleaning it *before* repairs, so that the mechanic who tears it down and works on it won't need to waste 40% of his time wiping and scraping greasy muck. But whatever his purpose, you may be sure he's saving his company money, for JENNY is one of the greatest time, labor and money saving shop tools any plant can own.

Hypressure JENNY cleans anything . . . anywhere . . . *10 times faster, and better* than solvent-brush-and-scraper methods. JENNY is powerful, portable, and easy to use. Ordinary labor can operate it. With more than 40 models to choose from, there is one to suit your cleaning requirements. Your letter, or the coupon below, will bring you full particulars without obligation.

- Semi-finished Products
- Machinery
- Motor Armatures
- Conveyors
- Cranes
- Lifts
- Floors
- Walls
- Paint Booths
- Windows
- Lavatories
- Exhaust Ducts
- Filters
- Building Exteriors
- Railroad Cars
- Trucks, etc.

. . . and by clean housekeeping, **REDUCE THE DANGER OF FIRES IN YOUR PLANT.**

DROP IT IN THE MAIL TODAY!

HYPRESSURE JENNY DIVISION

HOMESTEAD VALVE MANUFACTURING COMPANY

"Serving Since 1892"

P. O. BOX 23 CORAOPOLIS, PA.

Please send full information on Hypressure JENNY Steam Cleaner to:

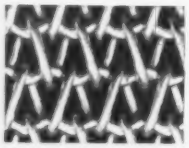
Name_____ Title_____

Company_____

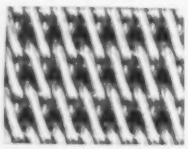
Address_____

City_____ State_____

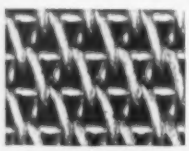
How to select WOVEN WIRE CONVEYOR BELTS for Continuous HEAT TREATING



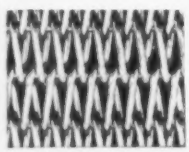
BALANCED—High tensile strength, low ultimate cost belting for operation up to 1300°F. Resists distortion. Designed for straight travel.



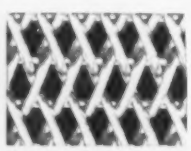
DUPLEX—Compact structure of great density provides high tensile strength, while close mesh provides smooth surface for carrying small parts.



ROD-REINFORCED—Highest tensile strength and low thermal capacity. Recommended for high temperature work, up to 2100°F. Undergoes minimum elongation and width contraction.



GRATEX—Close spirals retain the advantages of Balanced weave, while adding strength. For cold, medium and some high temperature applications.



DOUBLE BALANCED—A widely used weave combining open mesh of Balanced Weave with the strength of Gratex. For cold, medium and some high temperature applications.

As you know, woven wire conveyor belts are widely used for combining movement with processing in many continuous metalworking operations—brazing, annealing, sintering, quenching, tempering, washing, etc. Heat treaters, particularly, find that in all phases of their operations, belt-to-belt flow through processing eliminates manual handling, increases production efficiency and product uniformity.

However, there is no single type of belt construction suitable for all operations. Some must withstand the rigors of higher temperature service—up to 2100°F.; some require fine mesh for handling small parts; others must resist the corrosive attack of pickling processes and cooling operations. That's why Cambridge has nine basic weaves available in any metal or alloy. The five shown here are the most widely used in the metalworking industry.

There are several factors that generally influence selection of weave, mesh size and metal or alloy from which the belt will be woven. Among them are: size and shape of the parts to be handled, temperatures to which belt will be subjected, presence of wet or corrosive conditions. Even after these have been decided, overall belt construction must be designed to meet individual requirements—type of drive, selvage, support and special surface attachments must be selected.

You can see, then, that designing for continuous processing with woven wire conveyor belts is not a simple "nuts and bolts" job. Ramifications build up rapidly to demand the service of a specialist. That's why Cambridge maintains a staff of competent Field Engineers to help you select the Woven Wire Conveyor Belt to make your installation most efficient. You can rely on the experience of these engineers to specify just the right belt for you. In addition, they are thoroughly familiar with basic conveyor design. For the name of your nearest Cambridge Field Engineer, look under "Belting, Mechanical" in your classified telephone book. Or, write direct. Also ask for Special Report, "6 WAYS to Increase HEAT TREATING PRODUCTION", and 130-page Reference Manual of specifications and design information. THE CAMBRIDGE WIRE CLOTH CO., DEPARTMENT A, CAMBRIDGE 2, MD.

ogy engineers of the Sheffield Corp., Dayton, Ohio, developed a unique production method. This uses precision grinding equipment.

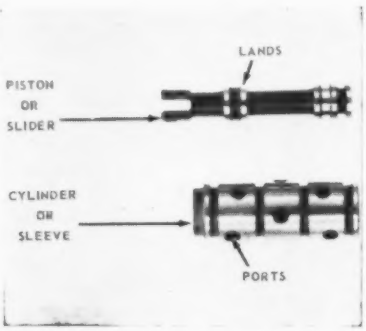
This production routing utilizes grinders that shape the circumferential contours from alloy bar stock. They machine the ports by the ultrasonic method.

Lands Match Sleeve Ports

The critical final grind-to-match utilizes a grinder within an extended work table and a tandem optical system.

The finish grind is accomplished through simultaneous optical comparison of each cylinder port and its corresponding piston land. The ports of the matching cylinder are simultaneously viewed through the other scope to determine the depth of grind required by the operator. This final grinding actually matches the lands on the slider to the ports of the sleeve.

Before utilization of this high precision grinding technique, both parts had to be ground, imposing a double production load. Under the new set up, only the slider or piston is ground and the first



Piston lands match cylinder ports after grinding.

matching grind is usually sufficient to pass the assembled flow test. Any that do not pass are reground in the same machine, using in-process air gage control, permitting 0.00010-in. accuracy. Usually only one regrind is required to pass inspection.

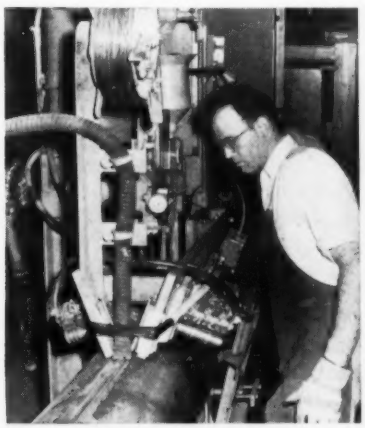
Under the old method, a dozen regrinds were often required, with many parts ending up as scrap due to lack of close control.

Welding:

New processes, fixtures boost output, cut labor cost.

Two carefully selected automatic welding processes and special fixtures enabled Rheem Mfg. Co., South Gate, Calif., to boost production of hot water heaters and decrease labor costs.

Selection of the two automatic processes came after a company study of former production meth-



Welder pushes button to weld a longitudinal seam of a shell.

ods. The firm considered time and costs involved in handling, welding, and finishing. Mechanized operations were desired, wherever possible, to step up production and insure quality work.

Automatic argon-shielded sigma welding replaced the manual arc welding of flues to bottoms of heaters. It was selected over other automatic processes because of the small diameters involved, fit-up problems, and the necessity of holding the arc in close proximity of the joint.

Speeds Exceed 100-ipm

A Linde SWM-3 welding outfit mounted over a rotating fixture designed and built by Rheem completes this welding operation in less than 30 seconds including loading time. This process produces smooth welds which eliminate the need for cleaning and grinding; it reduces arc time and percentage of rejects, and does not

Bright Annealing?
Normalizing?
Nitriding?
Spheroidizing?

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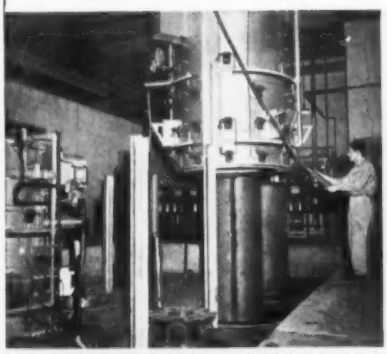
CONTINENTAL TOP HAT



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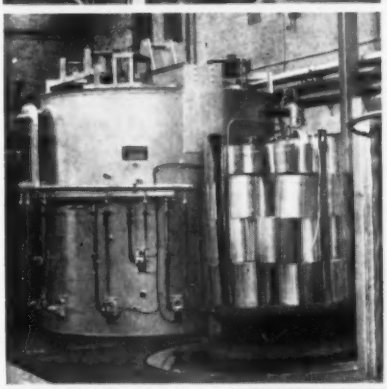

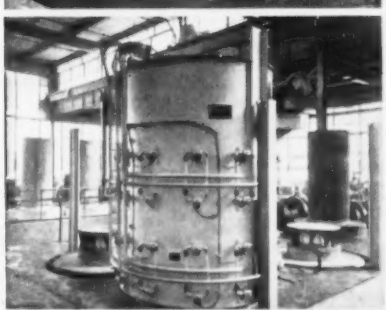

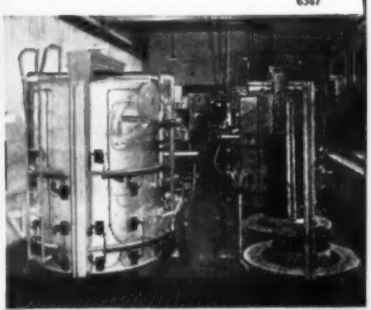

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require a specially skilled operator.

Speeds exceeding 100 ipm are attained in the automatic submerged arc welding of longitudinal seams of steel tank shells from sheets of 10 and 14 gage thicknesses. Welds are smooth and require little finishing.

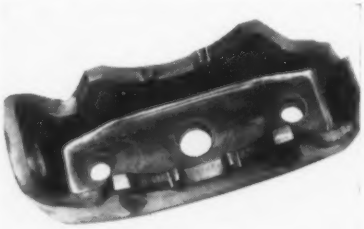
Saves On Manpower

Two men, using a Unionmelt DEH welding head attached to a special fixture designed and built by Rheem, now complete a job which previously required four men using a double loading fixture. One man pushes flat sheets of steel into a true circle roll that forms the shell and the other controls the welding operation. Two zinc blocks mounted on the forward side of the fixture help to reduce magnetic fields by providing additional grounding of the shell as it travels under the welding head. Previously, one man was required for rolling, another for end alignment, and two others for loading and welding.

Forming:

Presses form three intricately shaped parts.

At Ford Motor Co.'s new automotive chassis parts plant, Sterling, Mich., presses form three intricately shaped parts. The ma-



Formed on a 1000-ton press are truck spring seats like this one.

chines are automatic units for producing multi-operation stampings without intermediate handling, pickling or annealing. It forms piece parts from coils or preblanked stock, depending on scrap economy.

The parts are front arm suspension units, spring seats and rear axle housings. Two 2200-ton, 4 point suspension, 12-station machines shape the front arm suspensions. A 2200-ton, 3-point suspension, 11-station unit forms the rear axle housing banjo halves. A 1000-ton, 2-point suspension, 10-station press forms the spring seats, with two sets of tooling provided to make possible production of either automobile or truck spring seats on the same press.

A 2200-ton press makes front arm suspension units like this.

Presses operate at 12 to 18 strokes per minute.

Key factors in successfully producing these type parts are the presses' non-oscillating feed bars and individually adjustable wedge sides. In the feeding mechanism that handles parts between stations, only the fingers move in and out. The feed bars move only in the direction of the transfer of the part.

Verson Allsteel Press Co., Chicago, made the presses for Ford.

Finishing:

Washing machine completely removes chips from castings.

The problem of washing and completely removing metal chips from compressor castings has been solved by the installation of a new industrial washing machine at the La Crosse, Wis., plant of The Trane Co.

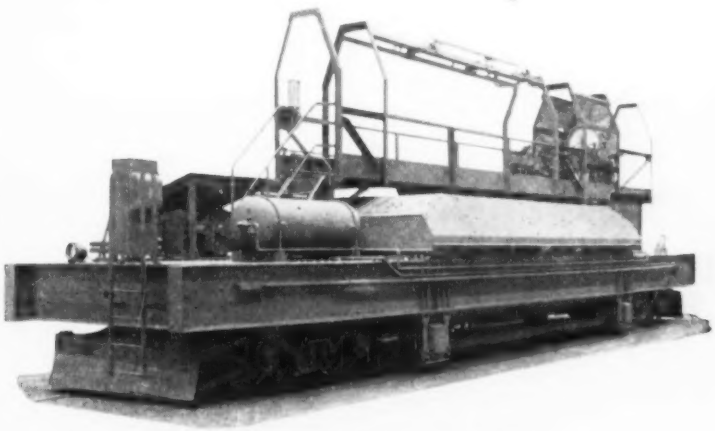
The machine designed and built by Industrial Washing Machine Corp., Matawan, N. J., processes

STOCK HOUSE OR HIGH LINE

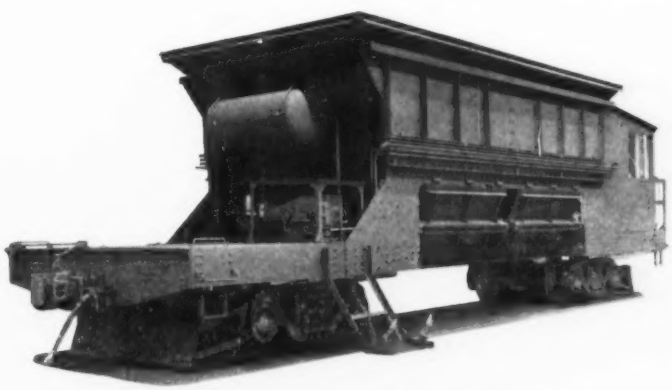
operators prefer the

DEPENDABILITY of ATLAS CARS

These specially designed units are another example of the ruggedness of Atlas Cars. Their dependability helps maintain the most rigid furnace charging cycles.



40-TON SCALE CAR
Double Hopper Bottom Dump



75-TON ORE TRANSFER
Gable Bottom Double Side Dump

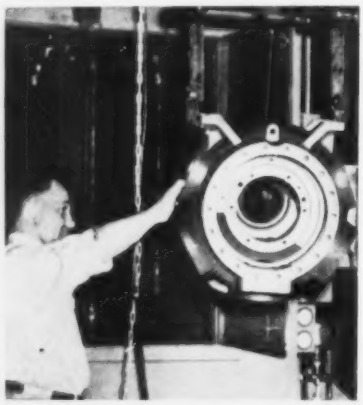
THE ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS
1140 IVANHOE RD. CLEVELAND 10, OHIO, U. S. A.

ten compressor castings an hour.

The difficulties involved in thoroughly removing chips from the inner recesses and tapped holes of the machined part have been eliminated. This is done by a rotating fixture which holds the compressor casting suspended in a special manner within the spray chamber. In operation, powerful sprays of hot detergent solution play upon the rotating compressor casting from the sides, top and bottom. This removes all traces of oil, metal chips and dirt; a rinsing spray follows, along with a rust preventive coating; then a steam bath at 300°F dries the casting.

The machine is 10 ft long, 6 ft wide and 11 ft high. It heats by steam.



Worker prepares a casting for the industrial washing machine.

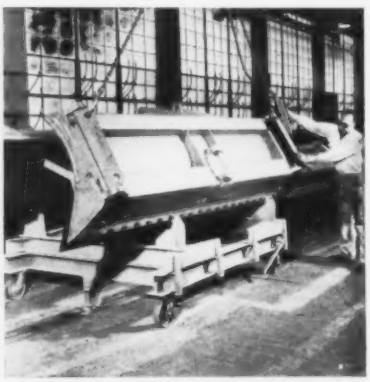
Handling:

In-the-floor conveyor moves through heat, cold.

An unusual application of an in-the-floor conveyor is in use at International Harvester Co.'s tractor works in Chicago. The conveyor carries bulldozer and bullgrader parts through finishing operations on an assembly line to outside storage.

Processing of blades, track frames and other heavy components presents a handling problem because of ungainly size and weight. By using the in-the-floor conveyor, a continuous flow of these parts-in-process are handled from cleaning through painting and drying to outside storage.

Cycle of operations is unusual in that the conveyor is subjected to 250°F in the drying tunnel. On occasion, they also face sub-zero weather out-of-doors. The outdoor track section is equipped with a steam pipe below the chain to keep the trough free of snow and ice.



A large bulldozer part gets placed on the in-floor conveyor.

The conveyor setup is a product of Link-Belt Co., Chicago.

Annealing:

Unusual roller hearth furnace anneals aluminum.

Four new 11-ft heating sections are being added to increase production of a recently installed roller hearth annealing furnace at the McCook, Ill. plant of Reynolds Metals Co.

By recirculating heated air on the top and bottom of the plate, the furnace heats 1¼-in. plate to 1000°F in 60 minutes. It affords a uniformity of 5° over its entire area. Maximum plate size is 11-ft 6 in. x 40 ft.

The sections are being added in the laboratory of the General Electric Co.'s industrial heating plant, Shelbyville, Ind. Here it is tested for actual heating rates.

Many of the units will combine to form a 220-ft furnace.

Perforations perplexing you?

If you have a design problem that's got you down maybe Hendrick can be of help. Sometimes the easiest and quickest way to enhance a product's beauty is to include a pleasing pattern of perforations in its design. Hendrick perforated metal not only helps increase a product's overall attractiveness, but also adds to its saleability as well. And whatever material you're using . . . whether it's metal, masonite, rubber, plastic, hard or insulated board for decorative display or fabricating purposes you can draw on Hendrick's long experience and perforating facilities to fill the bill. Write for details.

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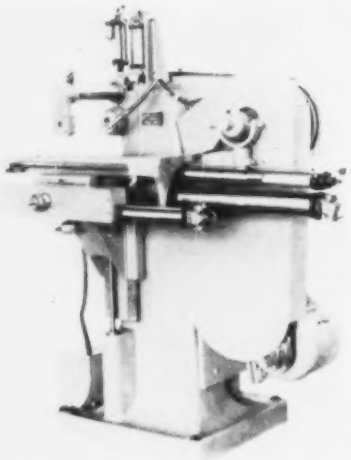
NEW EQUIPMENT

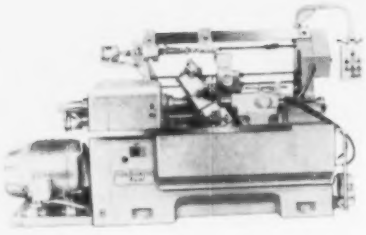
New and improved production ideas, equipment, services and methods described here offer production economies... for more data use the free postcard on page 113 or 114.



Special miller machines germanium, silicon

Milling of germanium, silicon and quartz for transistors, and other electronic products is done on this special milling machine. Completely automatic, it cuts off material to proper size by using a diamond impregnated rotating disk, supported on a revolving arbor. The miller allows complete freedom during experiments. Its table feed speed and cycle adjust to requirements. Special spindle speeds, arbor sizes, table cycles, etc., may be readily added. The material comes to the mill in cylindrical shape, generally not more than 5-in. long and 1-in. in diameter. This boule, as it is called, is first sliced into strips from 0.010 to 0.125 in. thick. These wafers are lapped and/or etched to their proper size and finish. This operation is usually done with a "gang" of blades on a single arbor. After the first cut, the work-holding fixture is indexed 90°, and the milling operation repeated. This produces a number of square pieces from each wafer. Clear water is the coolant; it prevents contamination and assists the user in reclaiming valuable chips. *U. S. Burke Machine Tool Div., Cincinnati Mfg. Corp.*

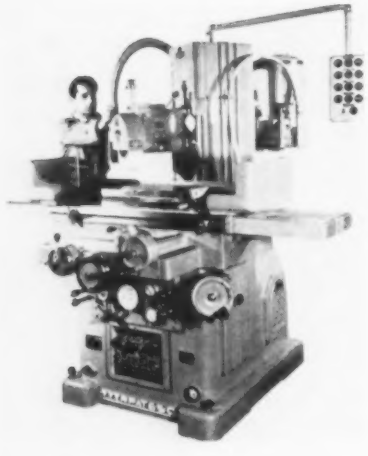
For more data circle No. 37 on postcard, p. 113



Tracer lathe accurately copies part contours

Versatile and automatic, this copying lathe employs a system of hydraulic controls. These permit high-speed production of profile-turned parts to exacting tolerances. A stylus accurately traces contours of the parts. The stylus moves over a motorized rotating template. The lathe is multicycling, and takes up to four repetitive cuts automatically. Although these particular copying lathes have been used for a number of years in Europe, they have only recently made their appearance in this country. The current trend to automation is bringing about their immediate and widespread acceptance. *Cone Automatic Machine Co., Inc.*

For more data circle No. 38 on postcard, p. 113



Single unit performs vertical, horizontal grinding

"Quick-change" surface grinders now provide horizontal, vertical and multi-angle grinding on the same basic machine. A rigid turnabout column, rotating 180°, makes the vertical and horizontal heads interchangeable almost instantaneously. The grinder becomes multi-angular by simply mounting a universal head on either side. Rotation and perfect positioning is effected in a matter of minutes simply by turning the column and clamping. The sturdy wide base of the column insures perfect support and high precision. The grinders range in table sizes from 12 to 48-in. wide, lengths from 24 to 360-in. They provide high-speed precision production of small as well as large workpieces. This multi-purpose unit performs all variations of die and toolroom grinding as well as production grinding. Dovetailing, V-way and bedway grinding and straight surface grinding are all within the capabilities of the machine. Power can be used for raising and lowering the grinding wheel. *S & S Machinery Co.*

For more data circle No. 39 on postcard, p. 113

AN EXAMPLE OF ALCHEMY

Transmutation of machine chips (background to foreground) from base steel to pure profit

The chips in the foreground aren't really gold – but they are the next best thing if you do extensive machining on circular forgings. They're Hi-Qua-Led Steel*. They are also the same grade steel as the chips in the background – 4140. You can see the great difference, but let us tell you something about it, too.

An initial production run in a customer's plant – using a Fellows gear shaper – produced both sets of chips. The regular 4140 steel forging had a Bhn of 285; the 41L40 Hi-Qua-Led Steel forging in the same grade had a Bhn of 285 to 293. Here are the results:

	4140 Steel	41L40 Hi-Qua-Led Steel
Roughing cut	50-60 sfm 0.0145 feed 0.530 depth of cut	80-85 sfm 0.0176 feed 0.533-0.538 depth of cut
Finish cut	50-60 sfm 0.0145 feed 0.033 depth of cut	100 sfm 0.0176 feed 0.025-0.030 depth of cut
State of finish	regular	super-finished
Total machining time	3½ hr average per gear (excluding down time for tool breakage)	2 hr average per gear (no tool breakage)

Machining time saved: 1½ hours or 43 per cent per gear. The savings shown in this particular test are typical of Hi-Qua-Led's performance in many applications. Further, when you use Hi-Qua-Led circular forgings you do not sacrifice any regular steel quality. Hi-Qua-Led in any AISI grade has the same attributes as regular steel of the same grade.

Investigate the possibilities of Hi-Qua-Led Steel in circular forgings from 18- to 145-in. OD. ALCO specialists will visit your plant to help you save the most from its machining potentials. Contact your nearest ALCO sales office, or write Spring & Forge Division, Dept. OCF-3, P. O. Box 1065, Schenectady 1, N. Y. for brochures.

Trade-mark registration pending. Patent applied for on lead-addition method.

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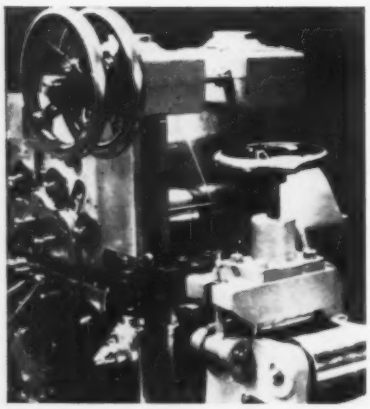
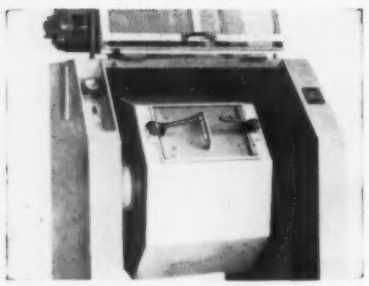


Reversing mill rolls ultra-thin gage strip

This reversing cluster mill rolls strip from about 0.010 to 0.0001-in. finishing thickness. Already proved in processing 18-8 stainless steel, high-temperature super-alloys, silicon steel, molybdenum, beryllium copper, platinum alloys, nickel-iron alloys and similar magnetic materials, the machine produces these in ultra-thin strip. It comes in a number of sizes, employing such work rolls as: 7/16 x 4 in., ¼ x 4 in. and 5/32 x 3 in. The mill drive can be applied either to the work rolls, the intermediate rolls or the backup rolls. The mill also comes in a twelve-high design. Also, a six-stand tandem arrangement of this type with 1¼ x 7 in. work rolls cold reduces carbon steel strip to 0.004 in. Normal power for the machine is a variable voltage dc drive, arranged for constant tension winding. Generally, it has a variable speed range up to 100-fpm and a coil build-up range from 6-in. OD. *Loma Machine Mfg. Co.*

For more data circle No. 40 on postcard, p. 113



Finishing barrel operates at variable speeds

Completely new, a finishing barrel operates at variable speeds. It features a 22 x 33-in. barrel of welded steel plate; this has a capacity of 1200-lb. Available in either single or double compartment units, it comes with or without neoprene linings. The barrel operates at a speed of from 7 to 30 rpm. Among the modern safety devices and controls with which the machine is equipped are a poppet-type venting valve, and a guard which functions as an automatic cut-off switch when raised. The finishing barrel unit is equipped with recessed controls. *The Abbott Ball Co.*

For more data circle No. 41 on postcard, p. 113

"We would be stumped without stud welding"... a quote from W. V. Brown, President of Brown Steel Tank Company, Minneapolis, manufacturer of truck and trailer tanks. This statement comes after 10 years of stud welding... after ¾-million NELSON® studs. And the estimated cost reduction by stud welding is 50%!

That is why Mr. Brown says, "Wherever NELWELD® can be used to advantage, we use it." Possibly you could fasten some of your assemblies faster and better at less cost, too. Why not get to know NELWELD better? Use coupons at the right.

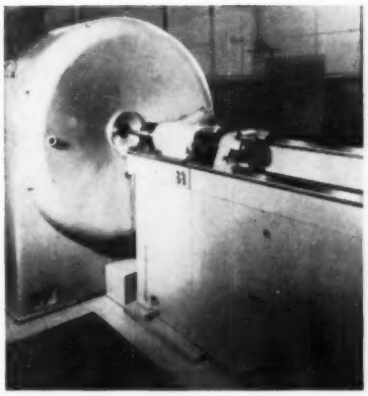
Four different types of Nelson studs are end-welded with this single gun NELWELD production unit. A simple fixture designed by Brown Steel Tank engineers makes it possible to switch quickly from one application to the next. This production unit is typical of those used in plants throughout the world.

NELWELD®

Machine cold forms metals at very low temperature

This machine cold forms metals through kneading or plasticizing materials at a very low temperature. Usually, this never exceeds 150°F. The machine transforms original unworked material into a finished product shape. It best produces surface-finished cylindrical pieces with close tolerance bores. The surface finish is 8-10 micro-inches. A finish of somewhat better than 2 micro-inches can be obtained, though. Experience indicates, however, that the 8-10 micro-inches finish is good enough for precision cylinders. It produces, with relative ease, tubular parts with a cylindrical outside diameter where the bore has a contour, such as internal splines or square holes. The unit cold forms both ferrous and non-ferrous materials; these must be ductile. Carbon and alloy steels as well as brass, bronze, aluminum, titanium, and stainless steels have been formed. *The Fellows Gear Shaper Co.*

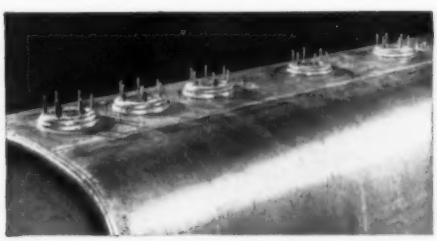
For more data circle No. 42 on postcard, p. 113



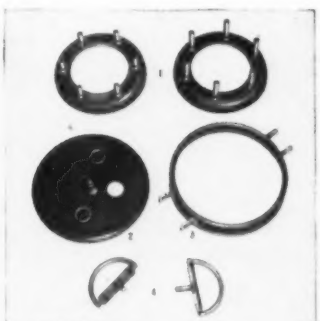
Side-load fork truck carries along extra helper

Helpers ride in style on this unique twin-cab, side-loading fork truck. Most duties can be handled by the operator alone. However, sometimes a helper can speed operations, and it may be somewhere remote from yard crews. So this unit has an extra cab in which a helper can be brought along in comfort regardless of weather. All controls are in the operator's cab. The other is just for transportation. This version of a materials handler known as the Traveloader is presently in use in the yards of a major steel company. It is specially adapted for this application, according to the manufacturer. *Baker-Rauling Co.*

For more data circle No. 43 on postcard, p. 113



Tank drain sumps with NELSON threaded studs are hand-welded to truck tank.



NELSON granular flux filled studs of various types are used in the fabrication of Brown truck tanks: (1) Six threaded studs end-welded to drain sumps, (2) threaded stud centered in fill cap, (3) fill cap neck with four hinge studs, (4) square studs on door lock handles.

50% cost reduction, leak-proof tanks

COUPON

Attach to your company letterhead and mail to:

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LORAIN, OHIO

Check here ○ if you would like us to send you a folder of cost-saving NELWELD applications.

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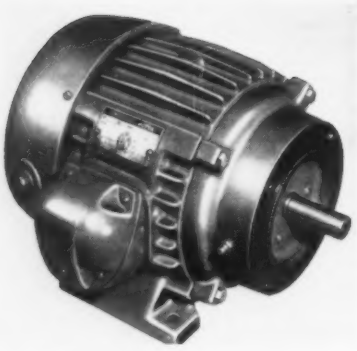
NELSON STUD WELDING... *Division of Gregory Industries, Inc., Lorain, Ohio*

Totally enclosed motor has mounting facilities



Totally-enclosed, a new motor has facilities for mounting driven equipment directly to it. An NEMA style "C" bracket with tapped holes for bolting from the driven equipment side provides accurate alignment. The motor comes in ratings of 1 to 30 hp. A shock resistant, heavily ribbed, cast-iron frame offers great strength and rapid heat dissipation. A guarded fan propels air over the ribs of the frame, this ensures maximum cooling as well as self-cleaning characteristics. A brass slinger prevents moisture from entering at the take-off shaft. Normalized castings prevent bearing misalignment. Special lubrication ensures complete purging of all grease during relubrication without disassembly of the totally enclosed electric motor. *U. S. Electrical Motors Inc.*

For more data circle No. 44 on postcard, p. 113

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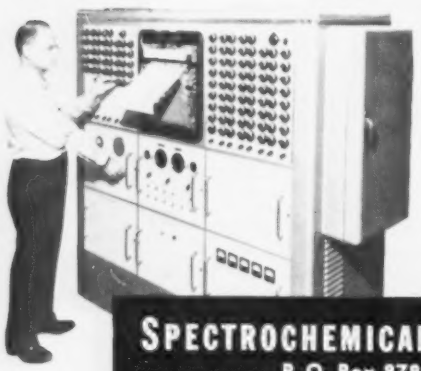

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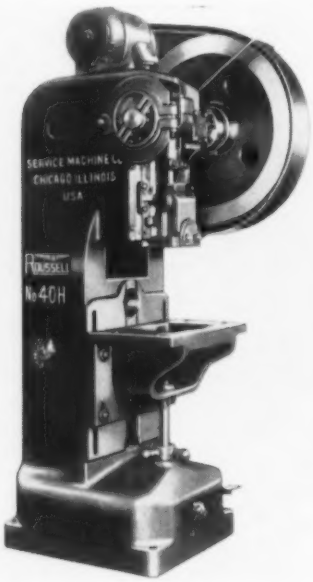
SPECTROCHEMICAL LABORATORIES, INC.
P. O. Box 8781, Pittsburgh 21, Pa.

Horn press

This 40-ton capacity unit performs a wide variety of work. Besides handling horning operations such as forming, punching and riveting hollow, odd shaped or cylindrical work, it has an adjustable bed table to accommodate dies and fixtures requiring large die space between the bed and the slide. Die space



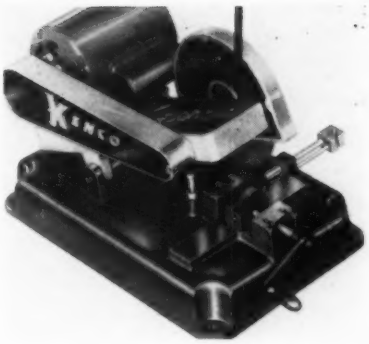
adjustment is made by merely turning a hand screw. This lets slugs and blanks fall through the table without interference from the elevating screw. Its frame is extra heavy and stoutly reinforced; the shaft bearings are very closely positioned. Standard equipment includes over - size, single - stroke clutch, roller bearing flywheel and replaceable bearings. *Service Machine Co.*

For more data circle No. 45 on postcard, p. 113

Cutoff saw combines high precision, economy

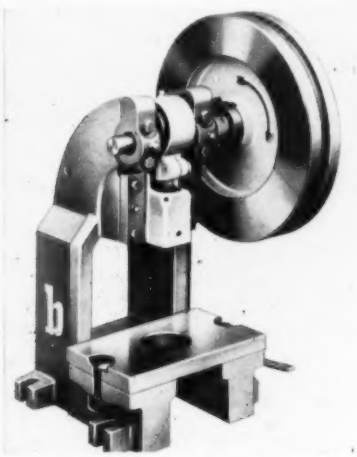
A simplified cutoff saw combines high precision with operating economy. It is simple to operate, is quickly set-up, and uses low power. The saw sets up for any run, including changeover from ferrous to non-ferrous metals, in only 1½ minutes. It eliminates tying up of milling machines or other costly equipment for cutoff production. It cuts up to ¾-in. bar stock in steel for production runs, and larger stock for tooling or short runs. It also cuts up to 1½-in. in non-ferrous bar stock for production runs. Simple in design, the unit can be operated easily and accurately by inexperienced personnel. The saw does not depend on the skill of the operator for its cutting accuracy. A fast-acting, heavy-duty integral vise holds work. The saw is in perfect alignment on all planes. Good balance, coupled with a new blade design, reduces the motor requirement to only 1-hp. The unit occupies little floor space. It moves from one location to another readily. It has cast iron and aluminum construction. *Kenco Mfg. Co.*

For more data circle No. 46 on postcard, p. 113



Gap frame press

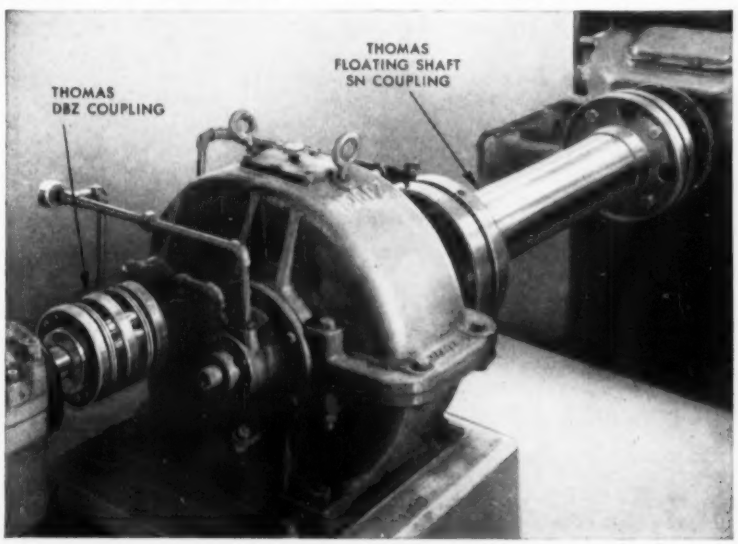
Designed for a multitude of operations requiring a wide gap between column members, is this 2-ton fixed bed, gap frame press. It supplies an opening 4½ in. wide through the back. This is sufficient for sizeable coil or sheet stock and many foil applications. A bed measuring 4½ x 7½ in. has a circular opening beneath its ram. Maximum shut height, bed to slide, is 4¼ in. with a standard stroke of ¾ in. Other strokes are available on request. The 2-ton press uses a heavy-duty, sliding key-type clutch. It has adjustable gibs with a ball-type ram adjustment and operates at 280 to 290 strokes per minute. Weight, less motor, is approximately 100 lb. *Benchmaster Mfg Co.*



For more data circle No. 47 on postcard, p. 113

THOMAS FLEXIBLE COUPLINGS

Give You Freedom From Coupling Maintenance



NO LUBRICATION **NO MAINTENANCE** **NO WEARING PARTS**

Future maintenance costs and shutdowns are eliminated when you install Thomas Flexible Couplings. These all-metal couplings are open for inspection while running.

They will protect your equipment and extend the life of your machines.

Properly installed and operated within rated conditions, Thomas Couplings should last a lifetime.

Under Load and Misalignment only Thomas Flexible Couplings offer all these advantages:

1 Freedom from Backlash
Torsional Rigidity
2 Free End Float
3 Smooth Continuous Drive with
Constant Rotational Velocity
4 Visual Inspection While
in Operation
5 Original Balance for Life
6 No Lubrication
7 No Wearing Parts
8 No Maintenance

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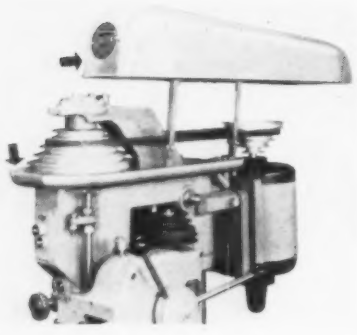
THOMAS

THOMAS FLEXIBLE COUPLING COMPANY
WARREN, PENNSYLVANIA, U.S.A.

Fiber glass drill press guard cuts noise



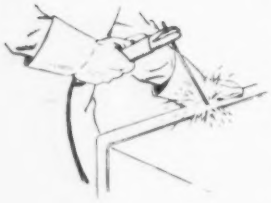
By using molded fiber glass, instead of the conventional steel stamping, for a drill press belt guard, a manufacturer has cut shipping costs and reduced operating noise. The guard is approximately 50 pct lighter than a sheet metal item of the same design. It deadens motor and belt sounds and eliminates rattles. Made of glass fibers and polyster resin pressure-molded in heated matched metal dies, the unit has ribbed reinforcement for additional strength. Like guards on other late model drill presses, it swings up and to the rear, away from the operator's face. This provides full visibility for changing belts. A serrated bolt on the guard enters a flexing, locking receptacle on the headpiece, holding the guard firmly in position when it is dropped. Although the piece part cost of the new guard is somewhat higher than for its steel counterpart, the initial cost of dies is only a fraction of that required for metal guard dies. *Molded Fiber Glass Co.*

For more data circle No. 48 on postcard, p. 113

miller ARC SPOT GENERATORS WELDERS

. . . WORLD'S LONGEST LINE OF WELDERS

Here's the List--



A-C Transformer Type
in 16 models from 20 to 800 amperes

A-C Submerged Arc Type
3 models, 150 to 1875 amperes

D-C Selenium Rectifier Type
12 models, 3 to 1500 amperes

D-C Selenium Rectifier Constant Potential Type
3 models, 300 to 1000 amperes

A-C/D-C Combinations for Metallic Arc Welding
6 models, 10 to 525 amperes

Spotwelders
14 models, 1.5 to 20 KVA

A-C and D-C Engine Driven Welders/Power Plants
6 models, 15 to 350 amperes

A-C/D-C Combinations for Inert Gas/Metallic Arc Welding
8 models, 10 to 550 amperes

A-C Inert Gas Welders
23 models, 5 to 700 amperes

High Frequency Units
9 models, up to 1000 ampere capacity

High Frequency Units with Water/Gas Controls
8 models, up to 1000 ampere capacity

PLUS: control panels, remote control units, water coolant systems, electrodes, electrode holders, running gear and welding accessories.

What's more, "... if it's Miller you know it's the finest..."

miller ELECTRIC MANUFACTURING CO., INC.
APPLETON • WISCONSIN

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Hardness tester

A new automatic "go—no go" Brinnell hardness tester production tests odd-shaped automotive rocker arms weighing 10 lb apiece. It correctly accepts or rejects these parts at rates up to 1000 per hour. Constructed as a revolving "three station" tester, it automatically grinds a smooth test surface, applies load (3000 kg), measures depth of impression, and accepts or rejects Brinelled parts without manipulation or judgment by the operator. He merely places the parts in the holders before they are rotated to the first station. The operator places two parts at a time in the holders on the periphery of the large circular work table, movement of which is controlled by a pre-set timer. The table automatically rotates a quarter turn to the grinding station. Here, twin grinding wheels create a small smooth area. *Tinius Olsen Testing Machine Co.*

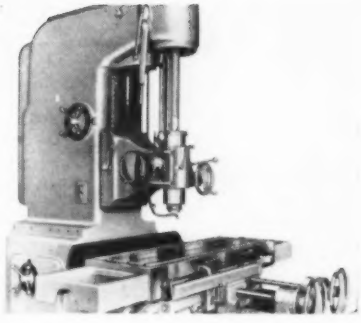
For more data circle No. 49 on postcard, p. 113

Mechanical packings

Popular mechanical packings used in industrial, power, and processing plants are available. There are many types of mechanical packings produced from a few basic materials; at times duplications are unknowingly purchased. In an effort to eliminate this a firm has standardized these packing materials. *Flexrock Co.*

For more data circle No. 50 on postcard, p. 113

Boring, milling unit is versatile, fast, accurate



Versatile, fast and accurate, this vertical machine does precision boring and milling. It comes in two sizes; vertical capacity on both is 30-in. The smaller, with a heavy 18 x 52-in. bed-type table, has 18-in. cross travel and 28-in. longitudinal travel. The larger, with a 18 x 60-in. table, has 18-in. cross and 36-in. longitudinal travel. A wide, fixed-type bed, equipped with 3-way bearings, provides solid table support. The spindle and spindle head are precision counterbalanced for smooth operation. Quick change tooling for the spindle, and table and saddle locating counters save considerable time. Its designers made the machine simple and easy to operate. *W. B. Knight Machinery Co.*

For more data circle No. 51 on postcard, p. 113

Variable speed motor

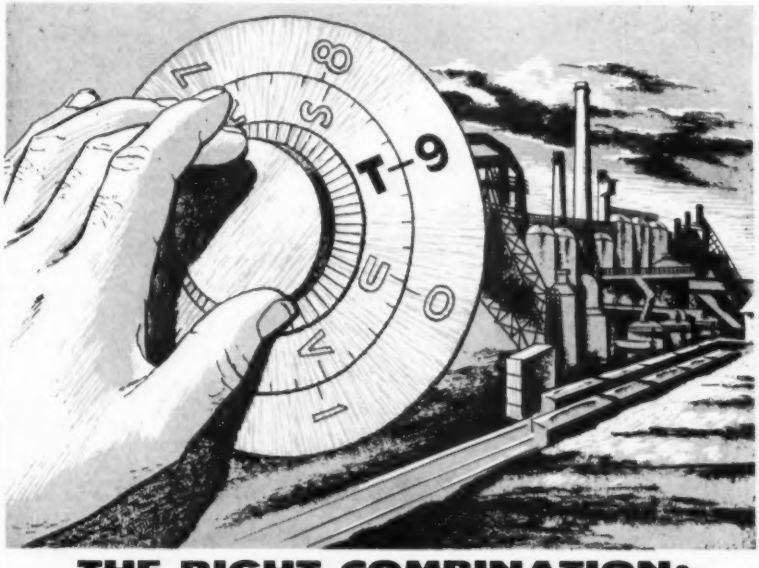
New gear motors and variable speed motors with reducer have just been developed for severe radial load duty. This is accomplished through extended bearing construction on the speed reducer. The distance between bearings on the output shaft has been lengthened, thus increasing both radial load capacity and rigidity. Ratings now available, and others on the drawing board, will complete the line through 15 horsepower. All standard AGMA speeds are furnished from 350 rpm through 20 rpm in both constant and variable speed models. *Sterling Electric Motors, Inc.*

For more data circle No. 52 on postcard, p. 113

High strength alloy

A new high-strength alloy for key jet engine components operates in the 1200 to 1400°F temperature range. Designed J1300, the new material is a high-strength iron base alloy with a strength-to-weight ratio 25 to 40 pct over comparable materials. Its operating temperature is 100°F higher than the company's other materials now in use. The material has a low content of strategic metals (no cobalts, no columbium, and little nickel). It has a life of 1000 hours or more at 15,000 psi and 1500°F. The alloy appears to be an excellent high-strength bar and forging material for the medium temperature range. It also shows great potentialities as high-strength sheet in the 1200 to 1500°F range, its developers say. It demonstrates good weldability and formability. It is now in the prototype production stage. *General Electric Co.*

For more data circle No. 52 on postcard, p. 113



THE RIGHT COMBINATION:

T-9 Plus Complete Engineering Plus Installation Assistance

Like Steel — pioneering in special alloys to meet specific requirements — the Mexico Refractories Company, too, continues persistent pioneering in the Special Plastic Refractory field.

High quality standards are recognized as "every-day" procedure in American industry — and so it is at Mex-R-Co where quality standards are so high in the production of Plastic Refractory products that our customers refer to them as "Idealistic."

Such a product is MONO T-9 — a special Super-duty Plastic Firebrick EQUAL TO HIGH-BURNED SUPER-DUTY CLAY-BRICK for lining Steel Industry Furnaces, such as:

- SLAB HEATERS
- SOAKING PIT COVERS
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MONO T-9 is so unique in application that we prefer to treat each job individually, because we feel each job merits custom engineering to fit particular plant conditions.

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FREE: (For your Technical File) Complete physical and chemical properties and technical details on MONO T-9 will be gladly sent you upon request.

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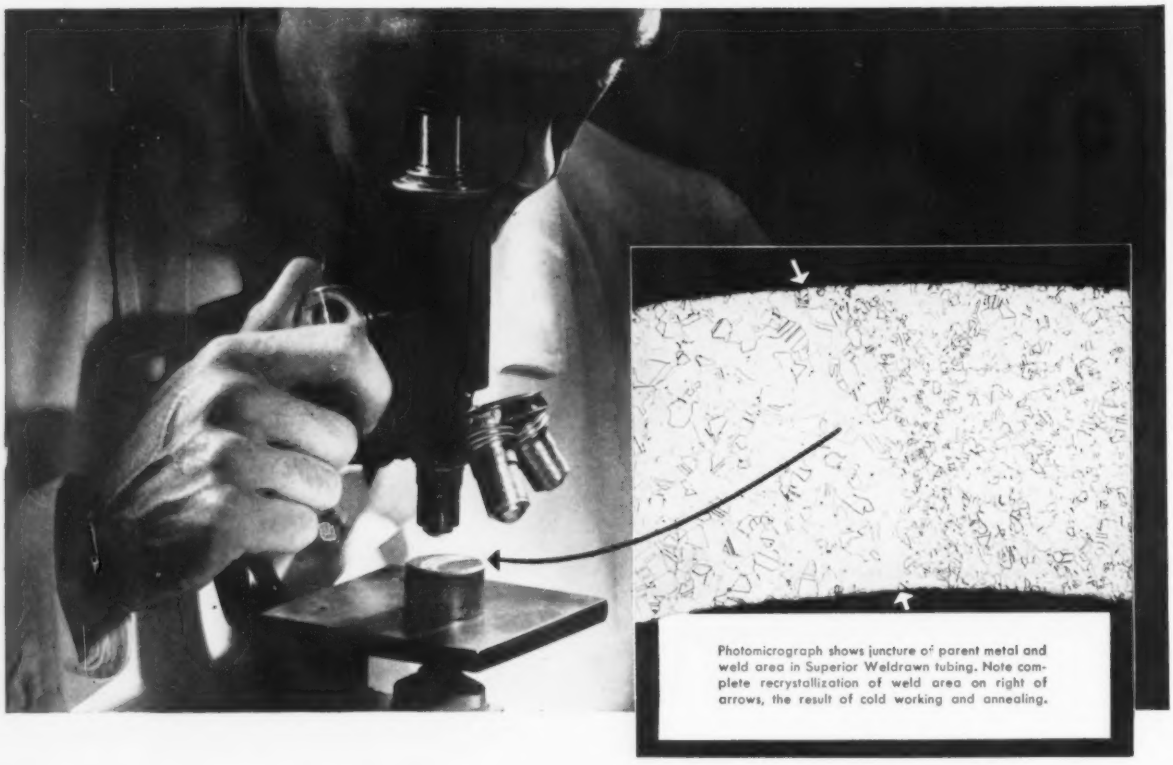
Weldrawn® Tubing *by* Superior



Photomicrograph shows juncture of parent metal and weld area in Superior Weldrawn tubing. Note complete recrystallization of weld area on right of arrows, the result of cold working and annealing.

So perfect the bead actually vanishes!

Here's how to cut tubing costs up to 50%

Specify Superior Weldrawn. You get quality approaching that of seamless, at savings as high as 50%! Unlike other welded tubing, Weldrawn is offered in *any* of the intermediate sizes—made possible because of the redrawing after welding.

"Weldrawn" Means—

This is a tubing far superior to ordinary welded tubing for many applications requiring forming, machining and corrosion resistance. After welding, it undergoes alternate cold drawing and annealing.

The weld area recrystallizes (see photo above), acquiring mechanical properties equivalent to those of the parent metal. The bead actually vanishes!

Costs Are Low

Weldrawn tubing is produced in 18 different analyses, in a wide variety of sizes. Cost savings are 10 to 20%. In certain materials you save up to 50%!

Quality Is High

In Weldrawn you get tubing with highly uniform mechanical properties throughout, and clean, smooth, bright ID and OD surfaces. Because no filler or flux is used during welding, the corrosion resistance of the weld area is equal to that of the parent metal. And by repeated redrawing and annealing after welding, any possible faults or defects in the weld are eliminated.

Specify Superior

In addition to Weldrawn tubing, we also offer a wide variety of analyses and sizes in Seamless grade. So for the finest in small tubing, always specify Superior.

Whatever your problems in small tubing, Superior can help you. For additional information on Weldrawn, write for Data Memorandum No. 2. Superior Tube Company, 2004 Germantown Ave., Norristown, Pa.

Superior Tube

The big name in small tubing

NORRISTOWN, PA.

All analyses available in .010 in. to ⅝ in. OD—certain analyses in light walls up to 2½ in. OD

West Coast: Pacific Tube Company, 5710 Smithway St., Los Angeles 22, Calif. • RAymond 3-1331

The Iron Age SUMMARY . . .

The customers are no longer worried about their steel supply . . . Combination of changed business conditions and inventory policies puts users in driver's seat . . . Outlook.

Customer In Saddle . . . It looks as though users of steel products other than plates and shapes are no longer worried about the supply outlook. The combination of shifting market and inventory conditions is putting the customer more firmly in the driver's seat.

Steel consumption probably is not much lower than at this time last year. But the difference lies in the slowdown of automotive and appliance business plus the prospects for continued labor peace. In prior years, steel users had to keep one eye cocked on their inventories because of the ever-present threat of strikes. The three-year contract in steel has changed all that.

As a result, most buyers are ordering in more leisurely fashion. And lower inventories are like money in the bank at a time of tight credit.

Times Change . . . Sheet users especially are in a position to call the tune. And the mills are dancing it. They are eagerly courting customers who several months ago had to take what was offered.

For example: A large eastern mill is thumbing through its customers' list and weeding out companies which had been forced to buy mill quantities from warehouses. These outfits are being offered mill shipments.

Another interesting turn is that some mills are using tight steel products to pick up orders for more plentiful items. Tie-in sales are being made involving seamless pipe, which is tight, and buttweld pipe, which is in good supply.

At least three large strip mills are now booking substantial tonnages of light plate. This takes up the slack caused by the easier sheet-strip market. There's still plenty of light plate business around. So chances are that even greater tonnages will be booked in the months ahead.

The Outlook . . . The entire steel outlook appears to hinge on the inventory policies of major users. At the moment, the automakers and appliance manufacturers are still reducing their inventories. Reports from Detroit indicate that the auto companies—at least some of them—are shooting for a 15-day inventory. This is a bare minimum.

One encouraging note is that two of the Big Three plan to take out their full allotments for March and probably for April. But the other member of the Big Three is still dragging his feet on March tonnage. What he will do in April may be the key to the future trend.

Steel Output, Operating Rates

Production (Net tons, 000 omitted)	This Week 2,484	Last Week 2,509	Month Ago 2,484	Year Ago 2,462
Ingot Index (1947-1949=100)	154.6	156.2	154.6	153.3
Operating Rates				
Chicago	95.0	95.0	98.0	98.0
Pittsburgh	99.0	100.0*	99.0	104.0
Philadelphia	105.0	105.0	103.0	105.0
Valley	96.0	97.0*	97.0	92.0
West	101.5	105.0*	99.0	99.0
Buffalo	105.0	105.0	105.0	105.0
Cleveland	86.0	98.0	94.5	109.0
Detroit	106.0	103.0	105.0	105.0
S. Ohio River	89.0	88.0*	88.0	97.0
South	95.5	95.5	98.0	95.0
Upper Ohio R.	104.0	103.0	105.0	102.0
St. Louis	80.0	95.5	98.0	106.0
Northeast	40.0	40.0	31.0	85.0
Aggregate	97.0	98.0	97.0	100.0

*Revised

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.661	5.650	5.622	5.174
Pig Iron (Gross Ton)	$62.90	$62.90	$62.90	$59.09
Scrap, No. 1 hvy (Gross ton)	$53.33	$53.33	$57.83	$48.67
Nonferrous				
Aluminum ingot	27.10	27.10	27.10	24.40
Copper, electrolytic	32.00	34.00	34.00	43.00
Lead, St. Louis	15.80	15.80	15.80	15.80
Magnesium ingot	36.00	36.00	36.00	33.25
Nickel, electrolytic	74.00	74.00	74.00	64.50
Tin, Straits, N. Y.	100.50	103.00	103.00	101.00
Zinc, E. St. Louis	13.50	13.50	13.50	13.50

*Revised

Tie-In Sales Enter the Act

Mills use hard-to-get products to drum up orders for others in more plentiful supply . . . Buttweld and seamless pipe are examples . . . Light plate users get windfall.

◆ THE TIE-IN SALE is rearing its head in the steel market. Some mills are using hard-to-get products as a means of drumming up orders for items in easier supply.

One large mill is urging buyers to take buttweld pipe, which is easy, when they order seamless, an item in tight supply. In this way, the mill is trying to keep supply of both products in some kind of balance.

The easier tone in sheets and strip is proving a big windfall for users of light plate. For this reason, the bind in light plate is loosening up as the mills roll more of it on sheet-strip equipment. Hot-rolled sheet users also are finding it easier to place orders.

But there's no letup in heavy plates and structurals. There's still plenty of conversion going on in heavy plates. Foreign mills also find eager takers in the present market.

The sheet market is suffering largely from the lethargy of automotive and appliance makers. A major producer of cold-rolled sheet says business is off about 11 pct from the 1955 peak. Large users seem bent on reducing their inventories to a minimum. One automaker reportedly is aiming at a 15-day inventory.

The bar market represents a mid-way point between the extremes in sheet and plate. Demand is off largely because of slow automotive ordering.

A change of policy in the pricing of special quality bars has been adopted by Joseph T. Ryerson & Son warehouse firm. The new policy abolishes the base price for special quality and reverts to the former custom of adding an extra. Reason: to eliminate confusion over whether merchant or special quality base prices applied on certain sizes and shapes.

Warehouses are passing along new mill extras to their customers.

Meanwhile, THE IRON AGE Finished Steel Composite Price rose to 5.661¢ per lb, reflecting base price increases on buttweld pipe by Bethlehem Steel Corp., following U. S. Steel's lead.

WIRE PRODUCTS . . . There was a January sales flurry at **Chicago** in merchant products, but it was followed by a slowdown in the latter part of the month for some of the smaller mills. However, these same producers are now beginning to spot a pickup in manufacturers' wire. Another strong product is barbed wire.

At **Cleveland** almost all standard items are available practically off the shelf when raw materials are obtainable. Cancellations and deferments of manufacturers' wire tonnages have been stepped up by auto suppliers. Merchant wire orders in February are about equal to January's.

In the **Philadelphia** market a major producer says wire products are on a "you name it" basis to customers.

U. S. Steel, American Steel & Wire Div., has increased base prices of upholstery wire and spring wire by $6 a ton. Upholstery wire is now $8.70 per 100 lbs at Cleveland, Donora, Duluth and Waukegan. It's $9 at New Haven, Trenton and Worcester. Manufacturers' bright spring wire is now 9.025 cents per lb at Cleveland, Donora, Duluth and Waukegan, and 9.325 cents per lb at Trenton and Worcester. Base price includes extras for chemistry and heat treatment.

STAINLESS . . . **Pittsburgh** stainless producers say orders are holding up, but coming in at a slower rate. One mill is into May on plates, still has some April tonnage left in sheets.

BAR . . . One **Pittsburgh** producer of h-r bars is booked to capacity through March. After that, some open space is expected except for smaller bar shapes and large flats. Cold finishers are reported well stocked.

There's been pickup in ordering of hot-rolled bar at **Chicago.** A good portion of the demand is coming from farm equipment people and some from the warehouses. One major producer reports cold-finished bar is off. Main reason is lack of automotive ordering, although other customers as well are slow in placing orders.

West Coast mills are going full steam ahead on bar production to keep up with high customer demand.

SHEET AND STRIP . . . **Pittsburgh** producers report users are ordering on a month-to-month basis and there's been no pickup in the volume of orders. Continued inventory cutbacks by appliance makers have weakened demand for enameling sheets.

Chicago warehouses continue their buying cutbacks in hot-rolled and cold-rolled sheet. They're also holding back on hot- and cold-rolled strip. The warehouses, however, do seem interested in h-r sheet over 40 in. in widths on their second quarter bookings. Galvanized sheet at **Chicago** is as readily available as cold- and hot-rolled sheet. Tinplate, on the other hand, is booked solid for the first half.

Some rolling schedules at **Cleveland** are not yet full for March on c-r sheet. Others, however, are booked full through April. H-r sheet is pretty well filled out through April, and demand is good.

PRICE CHANGES . . . Other producers followed lead of U. S. Steel in increasing pipe and tubing base prices. (See page 148.) Jos. T. Ryerson & Son have increased some warehouses prices (p. 149). U. S. Steel Export Co. revised base prices on pipe and wire effective Feb. 13. Youngstown Sheet and Tube Co. has increased alloy grade extras on h-r alloy bars, sheet, strip, plate and semi-finished steel. Same company also advanced extras on cold finished carbon and alloy steel bars.

Purchasing Agent's Checklist

PRICING: Steel prices are on the up escalator . . . . . p. 57

WASHINGTON: Defense Dept. hits disunified supply system . . . . p. 73

MACHINE TOOLS: The builders are encouraged about 1957 sales outlook . . . . . p. 77

Comparison of Prices

(Effective Feb. 19, 1957)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Feb. 19 1957	Feb. 12 1957	Jan. 22 1957	Feb. 21 1956
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.675¢	4.675¢	4.675¢	4.325¢
Cold-rolled sheets	5.75	5.75	5.75	5.325
Galvanized sheets (10 ga.)	6.30	6.30	6.30	5.85
Hot-rolled strip	4.675	4.675	4.675	4.325
Cold-rolled strip	6.870	6.870	6.870	6.29
Plate	4.87	4.87	4.87	4.52
Plates, wrought iron	10.40	10.40	10.40	10.40
Stainl's C-R strip (No. 302)	50.00	50.00	50.00	44.50
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$9.95	$9.95	$9.95	$9.05
Tin plates, electro (0.50 lb.)	8.65	8.65	8.65	7.75
Special coated mfg. ternes	9.20	9.20	9.20	7.85
Bars and Shapes: (per pound)				
Merchant bars	5.075¢	5.075¢	5.075¢	4.65¢
Cold finished bars	6.85	6.85	6.85	5.90
Alloy bars	6.125	6.125	6.125	5.65
Structural shapes	5.00	5.00	5.00	4.60
Stainless bars (No. 302)	43.25	43.25	43.25	38.25
Wrought iron bars	11.50	11.50	11.50	11.50
Wire: (per pound)				
Bright wire	7.20¢	7.20¢	7.20¢	6.25¢
Rails: (per 100 lb.)				
Heavy rails	$5.075	$5.075	$5.075	$4.725
Light rails	6.00	6.00	6.00	5.65
Semifinish Steel: (per net ton)				
Rerolling billets	$74.00	$74.00	$74.00	$68.50
Slabs, rerolling	74.00	74.00	74.00	68.50
Forging billets	91.50	91.50	91.50	84.50
Alloy blooms, billets, slabs	107.00	107.00	107.00	96.00
Wire Rod and Skelp: (per pound)				
Wire rods	5.80¢	5.80¢	5.80¢	5.025¢
Skelp	4.225	4.225	4.225	4.225
Finished Steel Composite: (per pound)				
Base price	5.661¢	5.650¢	5.622¢	5.174¢

	Feb. 19 1957	Feb. 12 1957	Jan. 22 1957	Feb. 21 1956
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$66.88	$66.88	$66.88	$63.09
Foundry, Valley	63.00	63.00	63.00	59.00
Foundry, Southern Cin'ti	67.17	67.17	67.17	62.93
Foundry, Birmingham	59.00	59.00	59.00	55.00
Foundry, Chicago	63.00	63.00	63.00	59.00
Basic del'd Philadelphia	66.38	66.38	66.38	62.77
Basic Valley furnace	62.50	62.50	62.50	58.50
Malleable, Chicago	63.00	63.00	63.00	59.00
Malleable, Valley	63.00	63.00	63.00	59.00
Ferromanganese, cents per lb‡ 74 to 76 pct Mn base.	12.75¢	12.75¢	12.75¢	9.50¢
Pig Iron Composite: (per gross ton)				
Pig iron	$62.90	$62.90	$62.90	$59.09
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$53.50	$53.50	$59.50	$49.50
No. 1 steel, Phila. area	57.50	57.50	58.50	50.50
No. 1 steel, Chicago	49.00	49.00	55.50	46.00
No. 1 bundles, Detroit	45.50	45.50	49.50	44.50
Low phos., Youngstown	53.50	53.50	62.50	53.50
No. 1 mach'y cast, Pittsburgh	56.50	56.50	60.50	55.50
No. 1 mach'y cast, Philadel'a.	57.50	57.50	60.50	54.50
No. 1 mach'y cast, Chicago	50.50	50.50	54.50	50.50
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	$53.33	$53.33	$57.83	$48.67
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$15.38	$15.38	$15.38	$14.25
Foundry coke, prompt	$17.50-$19	$17.50-$19	$17.50-$19	$16.25
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	32.00	34.00	34.00	43.00
Copper, Lake, Conn.	32.00	34.00	34.00	43.00
Tin, Straits, New York	*100.50*†	103.00	103.00	101.00
Zinc, East St. Louis	13.50	13.50	13.50	13.50
Lead, St. Louis	15.80	15.80	15.80	15.80
Aluminum, virgin ingot	27.10	27.10	27.10	24.40
Nickel, electrolytic	74.00	74.00	74.00	64.50
Magnesium, ingot	36.00	36.00	36.00	33.25
Antimony, Laredo, Tex.	33.00	33.00	33.00	33.00

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Averages of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

←To identify producers, see Key on P. 148→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	64.50	65.00	65.50	66.00	
Birmingham *R3*	58.50	59.00*			
Birmingham *W9*	58.50	59.00*	63.00		
Birmingham *U4*	58.50	59.00*	63.00		
Buffalo *R3*	62.50	63.00	63.50	64.00	
Buffalo *H1*	62.50	63.00	63.50		
Buffalo *W6*	62.50	63.00	63.50	64.00	
Chester *P2*	64.50	65.00	65.50		
Chicago *I4*	62.50	63.00	63.00	63.50	
Cleveland *A5*	62.50	63.00	63.00	63.50	67.50†
Cleveland *R3*	62.50	63.00	63.00	63.50	
Duluth *I4*	62.50	63.00	63.00	63.50	67.50†
Erie *I4*	62.50	63.00	63.00	63.50	67.50†
Everett *M6*		65.00	65.50		
Fontana *K1*	70.50	71.00			
Geneva, Utah *C7*	62.50	63.00			
Granite City *G2*	64.40	64.90	65.40		
Hubbard *Y1*			63.00		
Lone Star *L3*	58.50‡	59.00‡			
Midland *C11*	62.50				
Minnequa *C6*	64.50	65.00	65.50		
Monessen *P6*	62.50				
Neville Is. *P4*	62.50	63.00	63.00	63.50	67.50†
N. Tonawanda *T1*		63.00	63.50	64.00	
Pittsburgh *U1*	62.50		63.00	63.50	
Sharpsville *S3*	62.50	63.00	63.00	63.50	
So. Chicago *R3*	62.50	63.00	63.00		
Swedeland *A2*	64.50	65.00	65.50	65.50	
Toledo *I4*	62.50	63.00	63.00	63.50	
Troy, N. Y. *R3*	64.50	65.00	65.50	66.00	70.50
Youngstown *Y1*			63.00	63.50	

DIFFERENTIALS: Add, 50¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese or portion thereof over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. * Add $1.00 for 0.31–0.69 pct phos. † Intermediate low phos. ‡ Add $1.00 for 0.31 to 0.50 pct phos.

Silvery Iron: Buffalo, *H1*, $72.50; Jackson, *J1, I4* (Globe Div.), $71.50; Niagara Falls (15.01–15.50), $99.50; Keokuk (14.01–14.50), $110.00; (15.51–16.00), $105.00. Add $1.25 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 14 pct. Add 75¢ for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.): $64.00. Add $1.00 premium for all grades silvery 6 pct to 14 pct.

STAINLESS STEEL

Base price cents per lb f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	21.25	22.75	22.25	24.25	—	26.00	38.25	31.00	35.50	—	16.00	27.75	16.25
Slabs, billets	26.00	29.00	27.00	30.25	30.75	32.00	47.50	38.50	44.75	—	20.75	—	21.00
Billets, forging	—	35.00	35.75	36.50	39.50	39.00	59.75	45.25	53.50	30.75	27.25	27.75	27.75
Bars, struct.	40.50	41.25	42.50	43.25	46.25	46.00	70.25	53.25	62.25	36.25	32.50	33.00	33.00
Plates	42.50	43.25	44.50	45.50	48.00	48.75	73.75	57.50	67.00	38.75	33.75	35.50	34.50
Sheets	46.75	47.25	49.25	50.00	—	53.25	78.25	63.00	76.25	46.50	38.75	46.50	39.25
Strip, hot-rolled	34.50	37.50	35.75	39.00	—	42.50	66.50	51.50	61.00	—	29.75	—	30.75
Strip, cold-rolled	43.25	47.25	45.75	50.00	—	53.25	78.25	63.00	76.25	46.50	38.75	46.50	39.25
Wire CF; Rod HR	—	39.25	40.25 40.50	41.00 41.25	44.00	43.75	66.75 67.00	50.50 51.00	59.25 59.50	34.50	31.00	31.50	31.50

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Ft. Wayne, *J4;* Philadelphia, *D5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville, Pa., *U2;* Detroit, *M2;* Canton-Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *C5;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3* (plus further conversion extras); *W1;* New Bedford, Mass. (.25¢ per lb higher), *R6;* Gary, *U1* (.25¢ per lb higher).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R3;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5;* Ft. Wayne, *I4;* Philadelphia, *D5;* Detroit, *R5;* Gary, *U1.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2.*

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Philadelphia, *D5;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forgings billets: Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1.*

Market Stabilizing Indicated

Two-month's decline halts . . . Chicago prices hold on new broker and mill buying . . . Dock strike fails to break the Eastern market . . . Low offers are ignored by trade.

◆ NEW STRENGTH in Midwest markets may have halted the steady decline. After two months of consistently dropping markets, stabilizing forces are active in the market.

The sharp drop in Chicago and related markets had been responsible for most of the decline in THE IRON AGE Composite Price. This indicator declined almost $12 since mid-December. This week it held at $53.33.

Eastern markets have stubbornly refused to collapse in spite of bearish pressures. Even the Longshoremen's strike did not break the New York or Philadelphia markets, although these have been pegged by strong support.

Attempts last week and early this week to buy at below market quotations by and large failed to bring in expected tonnage. These efforts in Chicago and elsewhere were followed by increased broker buying prices.

The market slump continues in some areas. Even the optimists in the trade can't see a sharp rebounding. Some leveling out is still in line. But generally, there is little scrap in dealer yards. In spite of somewhat lower steel operating rates forecast for the summer, some willingness to hold scrap for possible higher prices later on is beginning to appear.

Questions to be answered in the next weeks are whether the East will remain firm and whether Chicago's new strength is temporary or solid enough to extend to related markets.

Pittsburgh . . . Prices of most grades are unchanged. The market has a weak tone, but attempts to buy No. 1 heavy melting under $53 have met with little success. Dealers are not holding back scrap, but their stocks are low, collections off. A major mill has reportedly cancelled a sizable portion of an old, high priced order as dealers were unable to ship before expiration date. Also, some tonnage is being offered for sub-brokering. Some cast grades are off on light foundry buying.

Chicago . . . New mill offers by major mills at the beginning of last week at $2 to $3 below previous offering prices failed to push down the market. At the same time, a smattering of sales to smaller mills indicated rising pressure behind the Midwest market. Checks of dealer stocks indicate yards at a low level. This was confirmed by both rising broker buying prices and by advancing mill purchase prices.

Philadelphia . . . This market continues to weaken. Export is off due to the longshoremen's strike, and there is little activity in the domestic market. Secondary steelmaking, low phos, and electric furnace grades were down $1. One mill reportedly bought a small tonnage of No. 1 heavy melting at $57, but there were no other offers at that price. Most brokers are holding the line at $58.

New York . . . The market remains firm, despite rumors of an easing demand. Attempts to purchase at lower prices have failed to bring in scrap. Scrap that is moving is at old prices. Export is expected to be stronger with the ending of the dock strike. There is little scrap in dealer yards.

Detroit . . . The market has entered a typical waiting period prior to bidding on March automotive lists. There will be no real test until first lists close. Indications are that prices have firmed slightly at present levels. Bids on industrial grades are not expected to be off any more than $1 to $2 from last month.

Cleveland . . . Primary grades dropped another $1 in Cleveland and the Valley on depressed broker buying, but secondary grades are holding up well. As an example of market weakness, one shipment to an area mill was held up and best alternative market was Buffalo at over $6 freight. Electric furnace grades are somewhat stronger and several Valley area mills have run down inventories almost to the limit. Railroads and some plants are holding up selling against possibility of higher prices.

Birmingham . . . The market continues to be very weak. Openhearth grades are off $1; railroad grades and specialties are also off $1. The cast market continues to be weak, principally because of slow business at pipe foundries. Export picked up, with one ship at Mobile paying premium prices to fill its cargo there, to avoid congestion elsewhere. The area's biggest consumer is expected to be back in the market soon after a long absence.

St. Louis . . . Movement of scrap has slowed about 20 pct below a month ago. One cause is declining prices, but some prices are still lower. Some foundry grades are off substantially, because consumers are out of the market.

Cincinnati . . . The market remained stagnant with dealers concentrating on filling shipments ordered earlier. Low prices are drying up many marginal sources, but break in the weather could make up for it. Some additional declines are possible next month, although dealer inventories are still low. The foundry market is largely unchanged.

Buffalo . . . Prices slipped $2 in steelmaking grades in a generally weaker market. Some dealers feel a further drop will take place when mills make their purchases early next month. Some small quantities of No. 1 cupola were purchased at $1 less than last week's market.

Boston . . . A scattering of grades are off $1. The market is generally weaker, both export and domestic. The longshoremen's strike has cut export off entirely and Northeast mills are mostly out of the market for the time being.

West Coast . . . Prices are steady in the three major Coast markets. Mills are taking no more than their melting requirements. Delayed ship arrivals point to stepped up exporting to Japan next month. Some 500 to 600 cars full of scrap are tied up.

MEMORANDUM
FROM ENGINEERING DEPARTMENT
12/12/56
Design Group
Att.: C. D. Smith
Vibrating Conveyor #3 broke down after approximately
17,000,000 cycles of operation. Spring return lever
failed, due to low fatigue resistance. Flexloc locknuts
worn, but still locked in original positions.
Recommendations:
1) Redesign lever to give increased strength in
center section.
2) Eliminate side play in lever motion which has
been causing excessive wear in related parts.
3) Continue use of Flexloc locknuts.
B.F.W.

Why designers specify FLEXLOC self-locking nuts

Where products must be tough . . . must stand up under vibration, shock and abuse . . . designers specify rugged, reliable, precision-built FLEXLOC self-locking nuts as fasteners.

HERE'S WHY:

FLEXLOC locknuts are strong: tensile strengths far exceed accepted standards. They are uniform: carefully manufactured to assure accurate, lasting spring tension in the flexible locking collars. And they are reusable: rough screw threads, repeated removal and replacement, frequent adjustments will not affect their locking life.

Standard FLEXLOC self-locking locknuts are available in a wide range of standard sizes and materials, to meet the most critical locknut requirements. Your authorized industrial distributor stocks them. Write us for complete catalog and technical data. Flexloc Locknut Division, STANDARD PRESSED STEEL CO., Jenkintown 17, Pa.

FLEXLOC® LOCKNUT DIVISION

STANDARD PRESSED STEEL CO.

SPS

JENKINTOWN PENNSYLVANIA

Scrap Prices *(Effective Feb. 19, 1957)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$53.00 to $54.00
No. 2 hvy. melting	47.00 to 48.00
No. 1 dealer bundles	53.00 to 54.00
No. 1 factory bundles	56.00 to 57.00
No. 2 bundles	45.00 to 46.00
No. 1 busheling	53.00 to 54.00
Machine shop turn.	39.00 to 40.00
Mixed bor. and ms. turn.	39.00 to 40.00
Shoveling turnings	43.00 to 44.00
Cast iron borings	43.00 to 44.00
Low phos. punch'gs plate	57.00 to 58.00
Heavy turnings	48.00 to 49.00
No. 1 RR hvy. melting	56.00 to 57.00
Scrap rails, random lgth.	68.00 to 69.00
Rails 2 ft and under	71.00 to 72.00
RR steel wheels	68.00 to 69.00
RR spring steel	68.00 to 69.00
RR couplers and knuckles	68.00 to 69.00
No. 1 machinery cast.	56.00 to 57.00
Cupola cast.	49.00 to 50.00
Heavy breakable cast.	47.00 to 48.00

Chicago

No. 1 hvy. melting	$48.00 to $50.00
No. 2 hvy. melting	43.00 to 45.00
No. 1 dealer bundles	49.00 to 50.00
No. 1 factory bundles	53.00 to 54.00
No. 2 bundles	39.00 to 40.00
New busheling	49.00 to 51.00
Machine shop turn.	33.00 to 34.00
Mixed bor. and turn.	35.00 to 36.00
Shoveling turnings	35.00 to 36.00
Cast iron borings	35.00 to 36.00
Low phos. forge crops	60.00 to 61.00
Low phos. punch'gs plate	55.00 to 57.00
Low phos. 3 ft and under	54.00 to 56.00
No. 1 RR. hvy. melting	54.00 to 55.00
Scrap rails, random lgth.	64.00 to 65.00
Rerolling rails	65.00 to 66.00
Rails 2 ft and under	68.00 to 69.00
Locomotive tires cut	57.00 to 58.00
Cut bolsters & side frames	57.00 to 58.00
Angles and splice bars	62.00 to 63.00
RR. steel car axles	77.00 to 78.00
RR. couplers and knuckles	56.00 to 57.00
No. 1 machinery cast.	50.00 to 51.00
Cupola cast.	44.00 to 45.00
Heavy breakable cast.	43.00 to 44.00
Cast iron brake shoe	42.00 to 43.00
Cast iron wheels	52.00 to 53.00
Malleable	64.00 to 65.00
Stove plate	43.00 to 44.00
Steel car wheels	56.00 to 57.00

Philadelphia Area

No. 1 hvy. melting	$57.00 to $58.00
No. 2 hvy. melting	49.00 to 50.00
No. 1 dealer bundles	57.00 to 58.00
No. 2 bundles	47.50 to 48.50
Machine shop turn.	41.00 to 42.00
Mixed bor. short turn.	43.00 to 44.00
Cast iron borings	43.00 to 44.00
Shoveling turnings	45.00 to 46.00
Clean cast chem. borings	49.00 to 50.00
Low phos. 5 ft and under	62.00 to 63.00
Low phos. 2 ft and under	63.00 to 64.00
Low phos. punch'gs	64.00 to 65.00
Elec. furnace bundles	60.00 to 61.00
Heavy turnings	53.00 to 54.00
RR. steel wheels	71.00 to 72.00
RR. spring steel	71.00 to 72.00
Rails 18 in. and under	75.00 to 77.00
Cupola cast.	52.00 to 53.00
Heavy breakable cast.	55.00 to 56.00
Cast iron car wheels	61.00 to 62.00
Malleable	66.00 to 67.00
Unstripped motor blocks	41.00 to 42.00
No. 1 machinery cast.	57.00 to 58.00

Cleveland

No. 1 hvy. melting	$49.00 to $50.00
No. 2 hvy. melting	44.00 to 45.00
No. 1 dealer bundles	49.00 to 50.00
No. 1 factory bundles	50.00 to 51.00
No. 2 bundles	38.00 to 39.00
No. 1 busheling	49.00 to 50.00
Machine shop turn.	32.00 to 33.00
Mixed bor. and turn.	35.00 to 36.00
Shoveling turnings	35.00 to 36.00
Cast iron borings	35.00 to 36.00
Cut struct'r'l & plates, 2 ft & under	57.00 to 58.00
Drop forge flashings	49.00 to 50.00
Low phos. punch'gs, plate	51.00 to 52.00
Foundry steel, 2 ft & under	53.00 to 54.00
No. 1 RR. heavy melting	56.00 to 57.00
Rails 2 ft and under	73.00 to 74.00
Rails 18 in. and under	74.00 to 75.00
Railroad grate bars	39.00 to 40.00
Steel axle turnings	37.00 to 38.00
Railroad cast.	54.00 to 55.00
No. 1 machinery cast.	54.00 to 55.00
Stove plate	51.00 to 52.00
Malleable	61.00 to 62.00

Youngstown

No. 1 hvy. melting	$51.00 to $52.00
No. 2 hvy. melting	47.00 to 48.00
No. 1 dealer bundles	51.00 to 52.00
No. 2 bundles	42.00 to 43.00
Machine shop turn.	31.00 to 32.00
Shoveling turnings	37.00 to 38.00
Cast iron borings	36.00 to 37.00
Low phos. plate	53.00 to 54.00

Buffalo

No. 1 hvy. melting	$51.00 to $52.00
No. 2 hvy. melting	44.00 to 45.00
No. 1 busheling	51.00 to 52.00
No. 1 dealer bundles	51.00 to 52.00
No. 2 bundles	41.00 to 42.00
Machine shop turn.	31.00 to 32.00
Mixed bor. and turn.	31.00 to 32.00
Shoveling turnings	34.00 to 35.00
Cast iron borings	32.00 to 33.00
Low phos. plate	56.00 to 57.00
Scrap rails, random lgth.	63.00 to 64.00
Rails 2 ft and under	67.00 to 68.00
RR. steel wheels	58.00 to 59.00
RR. spring steel	58.00 to 59.00
RR. couplers and knuckles	58.00 to 59.00
No. 1 machinery cast.	49.00 to 50.00
No. 1 cupola cast.	48.00 to 49.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$45.00 to $46.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 dealer bundles	45.00 to 46.00
No. 2 bundles	34.50 to 35.50
New busheling	45.00 to 46.00
Drop forge flashings	44.50 to 45.50
Machine shop turn.	28.00 to 29.00
Mixed bor. and turn.	31.00 to 32.00
Shoveling turnings	31.00 to 32.00
Cast iron borings	31.00 to 32.00
Low phos. punch'gs, plate	45.00 to 46.00
No. 1 cupola cast.	51.00 to 52.00
Heavy breakable cast.	44.00 to 45.00
Stove plate	45.00 to 46.00
Automotive cast.	54.00 to 55.00

St. Louis

No. 1 hvy. melting	$47.00 to $48.00
No. 2 hvy. melting	43.00 to 44.00
No. 1 dealer bundles	47.00 to 48.00
No. 2 bundles	38.00 to 39.00
Machine shop turn.	33.00 to 34.00
Cast iron borings	35.00 to 36.00
Shoveling turnings	35.00 to 36.00
No. 1 RR. hvy. melting	54.00 to 55.00
Rails, random lengths	55.00 to 56.00
Rails 18 in. and under	65.00 to 66.00
Locomotive tires uncut	53.00 to 54.00
Angles and splice bars	57.00 to 58.00
Std. steel car axles	70.00 to 71.00
RR. specialties	57.50 to 58.50
Cupola cast.	44.00 to 45.00
Heavy breakable cast.	40.00 to 41.00
Cast iron brake shoes	49.00 to 50.00
Stove plate	42.00 to 43.00
Cast iron car wheels	47.00 to 48.00
Rerolling rails	63.00 to 64.00
Unstripped motor blocks	40.00 to 41.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$47.00 to $48.00
No. 2 hvy. melting	36.50 to 37.50
No. 1 dealer bundles	47.00 to 48.00
No. 2 bundles	35.00 to 36.00
No. 1 busheling	47.00 to 48.00
Elec. furnace, 3 ft & under	50.50 to 51.50
Machine shop turn.	30.00 to 31.00
Mixed bor. and short turn.	32.50 to 33.50
Shoveling turnings	33.00 to 34.00
Clean cast chem. borings	35.00 to 36.00
No. 1 machinery cast.	47.00 to 48.00
Mixed cupola cast.	41.50 to 42.50
Heavy breakable cast.	46.00 to 47.00
Stove plate	41.00 to 42.00
Unstripped motor blocks	33.00 to 34.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$51.00 to $52.00
No. 2 hvy. melting	43.00 to 44.00
No. 2 dealer bundles	40.00 to 41.00
Machine shop turn.	32.00 to 33.00
Mixed bor. and turn.	35.00 to 36.00
Shoveling turnings	36.00 to 37.00
Clean cast chem. borings	33.00 to 34.00
No. 1 machinery cast.	49.00 to 50.00
Mixed yard cast.	45.00 to 46.00
Charging box cast.	46.00 to 47.00
Heavy breakable cast.	49.00 to 50.00
Unstripped motor blocks	37.00 to 38.00

Birmingham

No. 1 hvy. melting	$43.00 to $44.00
No. 2 hvy. melting	39.00 to 40.00
No. 1 dealer bundles	43.00 to 44.00
No. 2 bundles	31.00 to 32.00
No. 1 busheling	43.00 to 44.00
Machine shop turn.	34.00 to 35.00
Shoveling turnings	36.00 to 37.00
Cast iron borings	27.00 to 28.00
Electric furnace bundles	50.00 to 51.00
Bar crops and plate	55.00 to 56.00
Structural and plate, 2 ft	54.00 to 55.00
No. 1 RR. hvy. melting	49.00 to 50.00
Scrap rails, random lgth.	60.00 to 61.00
Rails, 18 in. and under	65.00 to 66.00
Angles & splice bars	59.00 to 60.00
Rerolling rails	64.00 to 65.00
No. 1 cupola cast.	51.00 to 52.00
Stove plate	51.00 to 52.00
Charging box cast.	40.00 to 41.00
Cast iron car wheels	42.00 to 43.00
Unstripped motor blocks	42.00 to 43.00
Mashed tin cans	15.00 to 16.00
Elec. furnace, 2 ft & under	48.00 to 49.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$48.50 to $49.50
No. 2 hvy. melting	41.50 to 42.50
No. 1 dealer bundles	48.50 to 49.50
No. 2 bundles	36.50 to 37.50
Machine shop turn.	34.00 to 35.00
Mixed bor. and turn.	33.50 to 34.50
Shoveling turnings	37.00 to 38.00
Cast iron borings	33.50 to 34.50
Low phos. 18 in. & under	55.00 to 56.00
Rails, random lengths	63.00 to 64.00
Rails, 18 in. and under	73.00 to 74.00
No. 1 cupola cast.	46.00 to 47.00
Hvy. breakable cast.	46.00 to 47.00
Drop broken cast.	55.00 to 56.00

San Francisco

No. 1 hvy. melting	$55.00
No. 2 hvy. melting	50.00
No. 1 dealer bundles	54.00
No. 2 bundles	38.00
Machine shop turn.	35.00
Cast iron borings	35.00
No. 1 RR. hvy. melting	55.00
No. 1 cupola cast.	60.00

Los Angeles

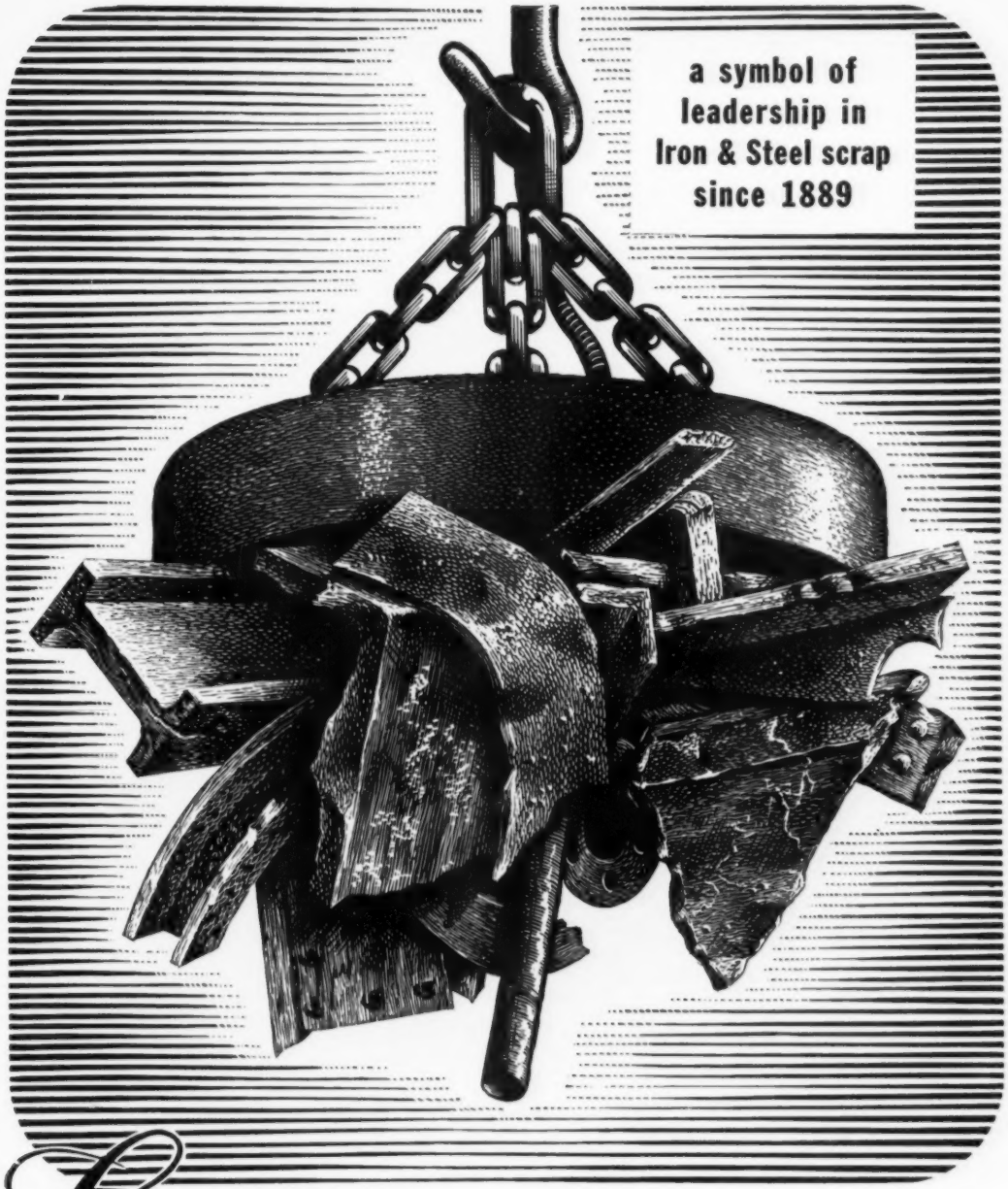
No. 1 hvy. melting	$55.00
No. 2 hvy. melting	51.00
No. 1 dealer bundles	54.00
No. 2 bundles	36.00
Machine shop turn.	35.00
Shoveling turnings	37.00
Cast iron borings	34.00
Elec. furn. 1 ft. and under (foundry)	66.00
No. 1 RR. hvy. melting	55.00
No. 1 cupola cast.	$57.00 to 58.00

Seattle

No. 1 hvy. melting	$55.00
No. 2 hvy. melting	51.00
No. 2 bundles	$31.00 to 34.00
No. 1 cupola cast.	55.00
Mixed yard cast.	55.00

Hamilton Ont.

No. 1 hvy. melting	$50.00
No. 2 hvy. melting	44.00
No. 1 dealer bundles	50.00
No. 2 bundles	38.00
Mixed steel scrap	42.00
Busheling	36.00
Bush, new fact., prep'd	48.00
Bush., new fact., unprep'd	44.00
Machine shop turn.	28.00
Short steel turn.	31.00
Mixed bor. and turn.	25.00
Rails, rerolling	56.00
Cast scrap	50.00



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EXPORTS-IMPORTS LIVINGSTON & SOUTHARD, INC. 99 Park Ave., New York, N. Y. *Cable Address:* **FORENTRACO**

Producers Copper Drops to 32c

Brass mills confident lower price will stimulate more orders . . . Depends on whether mill customers are satisfied new price will hold . . . Talk of renewed stockpiling.

◆ LATEST PRICE reduction by copper producers to 32¢ per lb will be just what the doctor ordered, say a number of brass mills. One mill calls 32¢ copper "realistic," expects it to bolster buying.

Brass mills are reducing their prices an average of 2¢ per lb of contained copper. Wire prices are also down 1½¢ to 2¢ per lb.

As with the previous price tumble, Phelps Dodge made the initial drop from 34¢ per lb, effective Monday, Feb. 18. Kennecott followed the same day, Anaconda the next day.

Despite the fact that the previous price was less than three weeks old, the drop didn't surprise most mills. They were saying 34¢ wasn't low enough to encourage buying. They feel better about 32¢.

But even so, there were some doubts.

Most mills say their customers do not have big inventories, have been buying hand-to-mouth in anticipation of a lower price. Mills themselves have high finished inventories and workable copper stocks.

Big "if" is whether customers will agree with the mills that the copper price will hold to 32¢. Most mills believe their customers will agree and come into the market for more mill products. This, they say, would put them into the copper market for heavier tonnages.

One mill, which holds this viewpoint, says the key factor is the fact that the 32¢ price is close to the operating costs of marginal, high-cost copper mines. A lower price would result in less copper on the market, and confusion on potential production.

Some mines have contracts for sale of their copper to Defense Materials Procurement Agency. Price is individually determined in each contract, based on operating costs plus set profit. The agreements take effect individually when the market price drops below the contract price.

Those without contracts would have to stop production.

There has been increasing sentiment for resumption of copper stockpiling to firm the sagging market. Some industry observers say the lower price will add fuel to this fire, but that government action in the near future is unlikely.

ALUMINUM . . . Gov. Harriman, N. Y., will approve the sale of power to Reynolds Metals Co. from the St. Lawrence River Project. Reynolds will get 200,000 kw of firm power, and 39,000 kw of interruptible power.

With this pact in its pocket, Reynolds plans to go ahead immediately with construction of its eighth aluminum reduction plant, near Massena, N. Y.

The power sale to Reynolds had been a hot political potato for some time. The seat of the trouble was the paragraph in the N. Y. State Power Act, 1931, which defined the duties of the State Power Authority. It requires hydroelectric power from certain projects ". . . shall be considered primarily as for the benefit of the people of the state as a whole and particularly the domestic and rural consumers to whom the power can economically be made available, and accordingly that sale to and use by industry shall be a secondary purpose, to be utilized principally to secure a sufficiently high load factor and revenue returns to permit rural and domestic use at the lowest possible rates . . ."

The clinchers were: (1) announcement that General Motors would build an aluminum foundry near the new Reynolds plant, (2) Reynolds' declarations of how much it would spend in New York for construction ($30 million) and yearly operation ($21 million).

The Reynolds power pact had no similarity to that of Aluminum Company of America, since Alcoa had given up its own power setup for promise of state power.

NICKEL . . . U. S. Commerce Dept. is attempting to tighten the screws a little on nickel distribution, particularly to plating supply firms. The department has asked nickel suppliers to develop a general set of distribution rules to "achieve equity" in delivering metal to users. Allocation lists are being revised. More market price nickel (74¢ per lb.) will be made available to small users, the department says.

International Nickel Co. is working out plans to correct "deficiencies or inconsistencies" in distribution to platers without hurting non-platers. The base period in setting allocation schedules has been changed from the six months ending June 30, 1950, to periods in 1955 or 1956.

Tin prices for the week: Feb. 13—102.50; Feb. 14—102.50; Feb. 15—101.75; Feb. 18—100.625; Feb. 19—100.50.*

*Estimate.

Note: Above prices, in many cases, are nominal. Dock strike in N. Y. had reduced spot tin supply to such an extent that no trading was reported on several days.

Primary Prices

(cents per lb)	Current price	last price	date of change
Aluminum ingot	27.10	25.90	8/10/56
Aluminum pig	25.00	24.00	8/10/56
Copper (E)	32.00	34.00	2/18/57
Copper (CS)	32.00	33.00	2/13/57
Copper (L)	32.00	34.00	2/19/57
Lead, St. L.	15.80	16.30	1/13/56
Lead, N. Y.	16.00	16.50	1/13/56
Magnesium ingot	38.00	34.50	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	74.00	64.50	12/6/56
Titanium sponge	250-275	270-300	12/4/56
Zinc, E. St. L.	13.50	13.00	1/6/56
Zinc, N. Y.	14.00	13.50	1/6/56

ALUMINUM: 99% ingot frt allwd. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig. Velasco, Tex. NICKEL: Port Colbourne, Canada. ZINC: prime western. TIN: see column at right, other primary prices, pg. 144.

WIRE STRAIGHTENING AND CUTTING with Air Clutch and Air Brake

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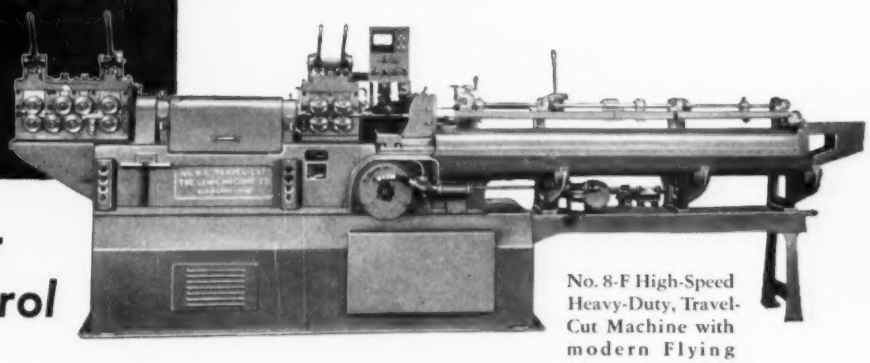
● Greater accuracy with a minimum of spot swell is achieved through three important improvements on the famous Lewis Travel-Cut Wire Straightening and Cutting Machines . . . Wichita Air Clutch and Brake and Reeves Variable Speed Drive. There are 34 models in the Lewis line from .012" to ¾" rounds and shapes at speeds up to 200 FPM. Write for new brochure.



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Capacity 1¼" X 12'

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Light and heavy machinery for all classes of sheet metal, plate and structural work.

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CHICAGO TOOL AND ENGINEERING CO., 8348 S. Chicago Ave., Chicago 17, Ill.

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WIRE—STRIP, COILED FOR ELECTRIC FUSE ELEMENTS

EYELETS ALSO BRASS OR STEEL

THE PLATT BROS. & CO., WATERBURY, CONN.

"DAVIS" KEYSEATER

Low in Cost. Durable. Easy to operate.
Table adjustable for straight or taper keyways.
Three sizes. Keyways 1/16" up to 1".

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Four, Five, Six, Eight Spindles • Work and Tool Rotating Type

GOSS & DE LEEUW MACHINE CO., KENSINGTON, CONN.

Nonferrous Prices *(Effective Feb. 19, 1957)*

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate

("F" temper except 6061-0)

Alloy	.032	.081	.136–.249	.250–3.
1800, 1100, 3003	44.3	42.1	40.9	40.2
5052	51.8	46.8	45.1	42.9
6061-0	48.9	44.6	42.8	42.6

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6–8	45.5–47.3	61.3–65.1
12–14	46.2–47.7	62.2–66.8
24–26	49.4–49.5	73.1–77.8
36–38	58.3–59.0	97.4–101.0

Screw Machine Stock—2011-T-3

Size"	¼	⅜–⅝	¾–1	1¼–1½
Price	59.7	58.8	57.4	55.2

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length" →	72	96	120	144
.019 gage	$1.352	$1.803	$2.254	$2.704
.024 gage	1.686	2.252	2.815	3.378

MAGNESIUM

(F.o.b. shipping Pt., carload frt. allowed)

Sheet and Plate

Type → Gage →	.250–3.00	.250–2.00	.188	.081	.032
AZ31B Stand. Grade		67.9	69.0	77.9	103.1
AZ31B Spec.		93.3	95.7	108.7	171.3
Tread Plate		70.6	71.7		
Tooling Plate	73.0				

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	69.6	70.7	75.6	89.2
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	113	97	118
Strip, CR	111	99	128
Rod, bar, HR	94	80	99
Angles, HR	94	80	99
Plates, HR	107	96	111
Seamless tube	144	120	190
Shot, blocks	-	78	...

COPPER, BRASS, BRONZE

(Freight included on 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	54.13	.....	51.36	54.32
Brass, 70/30	47.52	48.06	48.79	50.43
Brass, Low	50.20	50.74	50.14	53.01
Brass, R L	51.14	51.68	51.08	53.95
Brass, Naval	52.92	.....	47.23	56.33
Muntz Metal	50.99	.....	46.80	
Comm. Bz.	52.63	53.17	52.57	55.19
Mang. Bz.	56.66		50.76	
Phos. Bz. 5%	73.17		75.72	

Free Cutting Brass Rod $37.68

TITANIUM

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $11.00-$12.10; alloy, $14.75; Plate, HR, commercially pure, $9.25-$9.75; alloy, $11.25. Write, rolled and/or drawn, commercially pure, $8.50-$9.00; alloy, $11.00; Bar, HR or forged, commercially pure, $7.10-$7.35; alloy, $7.10-$7.30; billets, HR, commercially pure, $6.85-$7.10; alloy, $6.85-$7.05.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Antimony, American, Laredo, Tex. ... 33.50
Beryllium aluminum 5% Be, Dollar per lb contained Be $74.75
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.70
Calcium, 99.9%, small lots ..... $ 4.55
Chromium, 99.8% metallic basis .$ 1.31
Cobalt, 97-99% (per lb) $2.00 to $2.07
Germanium, per gm, f.o.b. Miami, Okla., refined ..... $48.50-$53.50
Gold, U. S. Treas., per troy oz. ... $35.00
Indium, 99.9% dollars per troy oz. .$ 2.25
Iridium, dollars per troy oz. ... $90 to $100
Lithium, 98% ..... $11.00 to $14.00
Magnesium, sticks, 100 to 500 lb. . 59.00
Mercury, dollars per 76-lb flask, f.o.b. New York ..... $255 to $257
Nickel oxide sinter at Copper Cliff, Ont., contained nickel . 71.25
Palladium, dollars per troy oz. $23 to $24
Platinum, dollars per troy oz. $98 to $101
Rhodium ..... $120.00 to $125.00
Silver ingots (¢ per troy oz.) ... 91.375
Thorium, per kg $43.00
Uranium, normal per kg $40.00
Vanadium ..... $ 3.45
Zirconium sponge $10.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
No. 115 ..... 32.50
No. 120 ..... 31.00
No. 123 ..... 29.50
80-10-10 ingot
No. 305 ..... 36.50
No. 315 ..... 34.50
88-10-2 ingot
No. 210 ..... 44.75
No. 215 ..... 41.50
No. 245 ..... 37.00
Yellow ingot
No. 405 ..... 25.75
Manganese bronze
No. 421 ..... 29.00

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max. 24.50-25.50
0.60 copper max. 24.25-25.25
Piston alloys (No. 122 type) .. 23.75-24.75
No. 12 alum. (No. 2 grade) .. 22.00-23.00
108 alloy 22.00-23.00
195 alloy 24.00-25.75
13 alloy (0.60 copper max.) .. 24.25-25.25
AXS-679 ..... 22.00-23.00

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97½% 22.75-23.75
Grade 2—92-95% 21.25-22.00
Grade 3—90-92% 20.50-21.50
Grade 4—85-90% 19.75-20.50

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	28	27½
Yellow brass	21⅞	20⅛
Red brass	25	24¼
Comm. bronze	25⅞	25½
Mang. bronze	20½	19¾
Yellow brass rod ends	21⅝	....

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 26⅛
No. 2 copper wire 24⅝
Light copper 23⅜
*Refinery brass 23⅛
*Copper bearing material ... 22⅞
*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 26⅛
No. 2 copper wire 24⅝
Light copper 23⅜
No. 1 composition 24½
No. 1 comp. turnings 24
Hvy. yellow brass solids 17
Brass pipe 18
Radiators 17½
Aluminum
Mixed old cast ..... 14½—15
Mixed new clips ..... 15½—16½
Mixed turnings, dry ..... 14 —15

Dealer's Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire ..... 23½—24
No. 2 copper wire ..... 22 —22½
Light copper ..... 20 —20½
Auto radiators (unsweated) .. 15¾—16¼
No. 1 composition ..... 21½—22
No. 1 composition turnings . 20 —20½
Cocks and faucets ..... 16¾—17¼
Clean heavy yellow brass .. 14¾—14¾
Brass pipe ..... 17¼—17¾
New soft brass clippings .. 19¼—19¾
No. 1 brass rod turnings .. 16¼—16¾

Aluminum

Alum. pistons and struts ... 5 — 5½
Aluminum crankcases ..... 10 —10½
1100 (2S) aluminum clippings 13¼—14
Old sheet and utensils ..... 10 —10½
Borings and turnings ..... 6½— 7
Industrial castings ..... 10 —10½
2024 (24S) clippings ..... 11½—12

Zinc

New zinc clippings ..... 6½— 7
Old zinc ..... 4½— 5
Zinc routings ..... 2½— 2¾
Old die cast scrap ..... 2¼— 2½

Nickel and Monel

Pure nickel clippings ..... $1.75-$1.85
Clean nickel turnings ..... $1.50-$1.60
Nickel anodes ..... $1.75-$1.85
Nickel rod ends ..... $1.75-$1.85
New Monel clippings 80-85
Clean Monel turnings 75
Old sheet Monel 75-80
Nickel silver clippings, mixed . 21
Nickel silver turnings, mixed 18

Lead

Soft scrap lead ..... 12½—13
Battery plates (dry) ..... 6¾— 7
Batteries, acid free ..... 4 — 4¼

Miscellaneous

Block tin ..... 77 —78
No. 1 pewter ..... 61 —62
Auto babbitt ..... 40 —41
Mixed common babbitt ..... 13 —13½
Solder joints ..... 18 —18½
Siphon tops 42
Small foundry type ..... 14¾—15
Monotype ..... 14 —14½
Lino. and stereotype ..... 13 —13½
Electrotype ..... 12¼—12¾
Hand picked type shells .... 9½—10
Lino. and stereo. dross ..... 4¾— 5
Electro. dross ..... 4 — 4¼

IRON AGE

STEEL PRICES

(Effective Feb. 19, 1957)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$107.00 *B3*		5.05 *B3*	7.40 *B3*	5.05 *B3*						
	Buffalo, N. Y.	$74.00 *B3, R3*	$91.50 *B3, R3*	$107.00 *B3, R3*	5.90 *B3*	5.05 *B3*	7.40 *B3*	5.05 *B3*	4.675 *B3, R3*	6.85 *R7*	6.95 *B3*			
	Claymont, Del.													
	Harrison, N. J.													14.55 *C11*
	Conshohocken, Pa.		$96.50 *A2*	$114.00 *A2*					4.725 *A2*	6.90 *A2*	6.95 *A2*			
	New Bedford, Mass.									7.30 *R6*				
	Johnstown, Pa.	$74.00 *B3*	$91.50 *B3*	$107.00 *B3*		5.05 *B3*	7.40 *B3*							
	Boston, Mass.									7.40 *T8*				14.90 *T8*
	New Haven, Conn.									7.30 *D1*				
	Baltimore, Md.									6.85 *T8*				
	Phoenixville, Pa.					5.85 *P2*		5.85 *P2*						
	Sparrows Pt., Md.								4.675 *B3*		6.95 *B3*			
	Bridgeport, Wallingford, Conn.	$79.00 *N8*	$96.50 *N8*	$107.00 *N8*						7.30 *W1* 6.95 *N8*				
	Pawtucket, R. I. Worcester, Mass.									7.40 *A5,N7*				14.90 *N7*
MIDDLE WEST	Alton, Ill.								4.875 *L1*					
	Ashland, Ky.								4.675 *A7*					
	Canton-Massillon, Dover, Ohio		$94.00 *R3*	$107.00 *R3, T5*						6.85 *G4*		10.10 *G4*		14.55 *G4*
	Chicago, Ill. Franklin Park, Ill.	$74.00 *U1, R3*	$91.50 *U1, R3,W8*	$107.00 *U1, R3,W8*	5.90 *U1*	5.00 *U1, W8*	7.35 *U1, Y1* 6.00 *W8*	5.00 *U1*	4.675 *N4* 4.675 *A1*	6.95 *A1,T8*			7.75 *W8, S9*	14.55 *A1, S9,T8*
	Cleveland, Ohio									6.85 *A5,J3*			7.75 *J3*	
	Detroit, Mich.			$107.00 *R5*					4.775 *G3, M2*	6.95 *M2,G3, D2,P11*	7.05 *G3*	10.10 *G3, D2*	7.75 *G3*	
	Anderson, Ind.									6.85 *G4*		10.10 *G4*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$74.00 *U1*	$91.50 *U1*	$107.00 *U1, Y1*	5.90 *I3*	5.00 *U1*	7.35 *U1,I3*	5.25 *I3*	4.675 *U1, I3,Y1*	6.85 *Y1*	6.95 *U1, I3,Y1*	10.20 *Y1*	7.75 *U1, Y1*	
	Sterling, Ill.	$74.00 *N4*							4.775 *N4*					
	Indianapolis, Ind.									7.00 *C5*				
	Newport, Ky.												7.75 *A9*	
	Middletown, Ohio													
	Niles, Warren, Ohio Sharon, Pa.		$91.50 *S1, C10*	$107.00 *S1, C10*					4.675 *S1, R3*	6.85 *T4*	6.95 *S1, R3*	10.00 *S1, R3*	7.75 *S1*	14.55 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$74.00 *U1*	$91.50 *U1, C11*	$107.00 *U1, C11*	5.90 *U1*	5.00 *U1, J3*	7.35 *U1, J3*	5.00 *U1*	4.675 *P6*	5.750 *P6* 6.85 *J3,B4, S7*			7.75 *S9*	14.55 *S9*
	Portsmouth, Ohio													
	Weirton, Wheeling, Follansbee, W. Va.					5.00 *W3*			4.675 *W3*	6.85 *W3,F3*	6.95 *W3*	9.65 *W3*		
	Youngstown, Ohio	$74.00 *R3*	$91.50 *Y1, C10*	$107.00 *Y1*		5.00 *Y1*	7.35 *Y1*		4.675 *U1, Y1*	6.85 *Y1,C5*	6.95 *U1, Y1*	10.20 *Y1*	7.75 *U1, Y1*	
WEST	Fontana, Cal.	$83.50 *K1*	$101.00 *K1*	$128.00 *K1*		5.75 *K1*	8.10 *K1*	5.90 *K1*	5.525 *K1*	8.70 *K1*				
	Geneva, Utah	$91.50 *C7*				5.00 *C7*	7.35 *C7*							
	Kansas City, Mo.					5.10 *S2*	7.45 *S2*		4.925 *S2*		7.20 *S2*			
	Los Angeles, Torrance, Cal.		$101.00 *B2*	$127.00 *B2*		5.70 *C7, B2*	8.05 *B2*		5.425 *B2, C7*	8.80 *C1*			8.95 *B2*	
	Minnequa, Colo.					5.30 *C6*			5.775 *C6*					
	Portland, Ore.					5.75 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$101.00 *B2*			5.65 *B2*	8.00 *B2*		5.425 *C7,B2*					
	Seattle, Wash.		$105.00 *B2*			5.75 *B2*	8.10 *B2*		5.675 *B2*					
SOUTH	Atlanta, Ga.								4.875 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$74.00 *T2*	$91.50 *T2*			5.30 *T2,R3* 5.25 *C16*	7.35 *T2*		4.675 *T2,R3* 4.975 *C10* 4.925 *C16*		6.95 *T2*			
	Houston, Lone Star, Texas	$80.00 *L3*	$96.50 *S2*	$112.00 *S2*		5.10 *S2*	7.45 *S2*		4.925 *S2*		7.20 *S2*			

IRON AGE

STEEL PRICES

(Effective Feb. 19, 1957)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized	Enameling	Long Terne	Hi Str. Low Alloy H.R.	H. Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled 19 ga.		Cokes* 1.25-lb. base box	Electro* 0.25-lb. base box	Holloware Enameling 29 ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.675 *B3*	5.75 *B3*				6.90 *B3*	8.525 *B3*			5.80 *W6*	† Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price, Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25-lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.	4.725 *A2*	5.80 *A2*				6.95 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										5.80 *B3*			
	Fairless, Pa.	4.725 *U1*	5.80 *U1*				6.95 *U1*	8.575 *U1*				$9.80 *U1*	$8.50 *U1*	
	New Haven Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.675 *B3*	5.75 *B3*	6.30 *B3*			6.90 *B3*	8.575 *B3*	9.275 *B3*		5.90 *B3*	$9.80 *B3*	$8.50 *B3*	
	Worcester, Mass.										6.10 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										6.00 *L1*			
	Ashland, Ky.	4.675 *A7*		6.30 *A7*	6.325 *A7*									
	Canton-Massillon, Dover, Ohio			6.30 *R3,R1*										
	Chicago, Joliet, Ill.	4.675 *W8, A1*					6.90 *U1*			5.80 *K2*	5.80 *A5,R3, N4,W8,K2*			
	Sterling, Ill.										5.90 *N4, K2*			
	Cleveland, Ohio	4.675 *J3, R3*	5.75 *J3, R3*		6.325 *R3*		6.90 *R3*	8.525 *R3, J3*			5.80 *A5*			
	Detroit, Mich.	4.775 *G3, M2*	5.85 *G3* 5.75 *M2*				7.00 *G2*	8.625 *G3*						
	Newport, Ky.	4.675 *A9*	5.75 *A9*											
	Gary, Ind. Harbor, Indiana	4.675 *U1, I3,Y1*	5.75 *U1, I3,Y1*	6.30 *U1, I3*	6.325 *U1, I3,Y1*	6.70 *U1*	6.90 *U1, Y1,I3*	8.525 *U1, Y1*			5.80 *Y1*	$9.70 *U1, Y1*	$8.40 *I3, U1,Y1*	7.15 *U1, Y1*
	Granite City, Ill.	4.875 *G2*	5.95 *G2*	6.50 *G2*	6.525 *G2*								$8.50 *G2*	7.25 *G2*
	Kokomo, Ind.			6.40 *C9*							5.90 *C9*			
	Mansfield, Ohio		5.75 *E2*			6.70 *E2*								
	Middletown, Ohio		5.75 *A7*	6.30 *A7*	6.325 *A7*	6.70 *A7*								
	Niles, Warren, Ohio Sharon, Pa.	4.675 *S1, R3,N3*	5.75 *R3*	6.30 *R3*	6.325 *N3*	6.70 *N3*	6.90 *S1, R3*	8.525 *S1, R3*					$8.40 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.675 *U1, J3,P6*	5.75 *U1, J3,P6*	6.30 *U1, J3*	6.325 *U1*		6.90 *U1, J3,R3*	8.525 *U1, J3*	9.275 *U1*		5.80 *A5, P6,J3*	$9.70 *J3, U1*	$8.40 *U1, J3*	7.15 *U1, J3*
	Portsmouth, Ohio	4.675 *P7*	5.75 *P7*								5.80 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.675 *W3, W5*	5.75 *W3, W5,F3*	6.30 *W3, W5*		6.70 *W3, W5*	6.90 *W3*	8.525 *W3*				$9.70 *W5*	$8.40 *W5*	7.15 *W5* 7.40 *W3*
	Youngstown, Ohio	4.675 *U1, Y1*	5.75 *Y1*		6.325 *Y1*		6.90 *Y1*	8.525 *Y1*			5.80 *Y1*			7.15 *Y1*
WEST	Fontana, Cal.	5.525 *K1*	7.00 *K1*				7.75 *K1*	9.775 *K1*				$10.45 *K1*	$9.15 *K1*	
	Geneva, Utah	4.775 *C7*												
	Kansas City, Mo.										6.05 *S2*			
	Los Angeles, Torrance, Cal.										6.60 *B2*			
	Minnequa, Colo.										6.05 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.375 *C7*	6.70 *C7*	7.05 *C7*							6.45 *C7*	$10.45 *C7*	$9.15 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.675 *T2, R3*	5.75 *T2,*	6.30 *T2, R3*							5.80 *T2,R3*	$9.80 *T2*	$8.50 *T2*	
	Houston, Tex.										6.05 *S2*			

STEEL PRICES

(Effective Feb. 19, 1957)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.125 *B3*	8.325 *B3*	7.40 *B3*					
	Buffalo, N. Y.	5.075 *B3,R3*	5.075 *B3,R3*	6.90 *B5*	6.125 *B3,R3*	8.325 *B5,B3*	7.40 *B3*	4.85 *B3*				7.20 *W6*
	Clayment, Del.							5.70 *C4*		6.85 *C4*	7.55 *C4*	
	Coatesville, Pa.							5.25 *L4*		6.85 *L4*	7.55 *L4*	
	Conshohocken, Pa.							4.95 *A2*	5.925 *A2*	6.85 *A2*	7.25 *A2*	
	Harrisburg, Pa.							5.80 *P2*	6.275 *P2*			
	Hartford, Conn.			7.35 *R3*		8.625 *R3*	7.40 *B3*					
	Johnstown, Pa.	5.075 *B3*	5.075 *B3*		6.125 *B3*			4.85 *B3*		6.85 *B3*	7.25 *B3*	7.20 *B3*
	Fairless, Pa.	5.225 *U1*	5.225 *U1*		6.275 *U1*							
	Newark, N. J.			7.30 *W10*		8.50 *W10*						
	Camden, N. J.			7.30 *P10*		8.50 *P10*						
	Bridgeport, Conn. Putnam, Conn.	5.30 *N8*	5.30 *N8*	7.20 *N8* 7.40 *W10*	6.20 *N8*	8.475 *N8*	7.50 *N8*					
	Sparrows Pt., Md.		5.075 *B3*					4.85 *B3*		6.85 *B3*	6.85 *B3*	7.30 *B3*
	Palmer, Worcester, Readville, Mass. Milton, Pa.	5.225 *M7*	5.225 *M7*	7.40 *B5,C14*		8.325 *A5* 8.625 *B5*						7.50 *A5,W6* 9.025 *T8*
	Spring City, Pa.			7.30 *K4*		8.50 *K4*						
MIDDLE WEST	Alton, Ill.	5.275 *L1*										7.40 *L1*
	Ashland,Newport,Ky							4.85 *A7,A9*		6.85 *A9*		
	Canton, Massillon, Ohio			6.85 *R3,R2*	6.125 *R3,T5*	8.325 *R3,R2, T5*						
	Chicago, Joliet, Ill.	5.075 *U1,R3, W8,N4* 5.575 *P13*	5.075 *U1,R3, N4* 5.575 *P13*	6.85 *A5,B5, W10,L2 W8,N9*	6.125 *U1,R3, W8*	8.325 *A5,B5, W8,L2,N9, W10*	5.875 *W8*	4.85 *U1,13, W8,A1*	5.925 *U1*	6.85 *U1,W8*	7.25 *U1*	7.20 *A5,K2 R3,N4,W7*
	Cleveland, Ohio	5.075 *R3*	5.075 *R3*	6.85 *A5,C13*		8.325 *A5,C13*	7.425 *R3*	4.95 *J3,R3*	5.925 *J3*		7.25 *J3,R3*	7.20 *A5, C13*
	Detroit, Mich.	5.175 *G3*	5.425 *G3*	7.05 *B5,P8* 7.10 *P3* 6.85 *R5*	6.225 *G3* 6.125 *R5*	8.525 *B5,P3, P8* 8.325 *R5*	7.525 *G3*	4.95 *G3*		6.90 *G3*		
	Duluth, Minn.											7.20 *A5*
	Gary, Ind. Harbor, Crawfordsville	5.075 *U1,13, Y1*	5.075 *U1,13, Y1*	6.85 *R3,M5*	6.125 *U1,13, Y1*	8.325 *R3,M4*	7.425 *U1,13, Y1*	4.85 *U1,13, Y1*	5.925 *13*	6.85 *U1,Y1*	7.25 *U1,Y1*	7.30 *M4*
	Granite City, Ill.							5.05 *G2*				
	Kokomo, Ind.											7.30 *C9*
	Sterling, Ill.	5.175 *N4*	5.175 *N4*									7.30 *K2*
	Niles, Warren, Ohio Sharon, Pa.			6.85 *C10*	6.125 *C10,S1*	8.325 *C10*	7.425 *S1*	4.85 *S1,R3*		6.85 *S1*	7.25 *S1,R3*	
	Pittsburgh, Pa. Midland, Pa.	5.075 *U1, C11,J3*	5.075 *U1,J3*	6.85 *A5,C8, J3,R3,S9, B4,W10,C11*	6.125 *U1, C11,J3*	8.325 *A5,R3, S9,C8,W10, C11*	7.425 *U1,J3*	4.85 *U1,J3*	5.925 *U1*	6.85 *U1,J3*	7.25 *U1,J3*	7.20 *A5,J3, P5*
	Portsmouth, Ohio											7.20 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							4.85 *W5*				
	Youngstown, Ohio	5.075 *U1, Y1,R3*	5.075 *U1, Y1,R3*	6.85 *U1,Y1, F2*	6.125 *U1,Y1*	8.325 *Y1,F2*	7.425 *U1,Y1,*	4.85 *U1,Y1, R3*		6.85 *Y1*	7.25 *Y1*	7.20 *Y1*
WEST	Emeryville, Cal.	5.825 *J5*	5.825 *J5*									
	Fontana, Cal.	5.775 *K1*	5.775 *K1*		7.175 *K1*		8.125 *K1*	5.60 *K1*		7.60 *K1*	8.00 *K1*	
	Geneva, Utah	5.175 *C7*						4.85 *C7*			7.25 *C7*	
	Kansas City, Mo.	5.325 *S2*	5.325 *S2*		6.375 *S2*		7.675 *S2*					7.45 *S2*
	Los Angeles, Torrance, Cal.	5.775 *C7,B2*	5.775 *C7,B2*	8.30 *R3,P14*	7.175 *B2*	10.20 *P14*	8.125 *B2*					8.15 *B2*
	Minnequa, Colo.	5.525 *C6*	5.525 *C6*					5.70 *C6*				7.45 *C6*
	Portland, Ore.	5.825 *O2*	5.825 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	5.775 *C7* 5.825 *B2* 6.025 *P9*	5.775 *C7* 5.825 *B2* 6.025 *P9*				8.175 *B2*					8.15 *C7,C6*
	Seattle Wash.	5.825 *B2* *N6*	5.825 *B2*				8.175 *B2*	5.75 *B2*		7.75 *B2*	8.15 *B2*	
SOUTH	Atlanta, Ga.	5.575 *A8*										7.40 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	5.075 *T2,R3* 5.325 *C16*	5.075 *T2,R3* 5.325 *C16*	7.45 *C16*			7.425 *T2*	4.85 *T2,R3*			7.25 *T2*	7.20 *T2,R3*
	Houston, Ft. Worth, Lone Star, Tex.	5.325 *S2*	5.325 *S2*		6.375 *S2*		7.675 *S2*	4.95 *S2* 5.20 *L1*		6.95 *S2*	7.35 *S2*	7.45 *S2*

† Merchant Quality—Specialty Quality .35¢ higher.

Steel Prices *(Effective Feb. 19, 1957)*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metals Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace, Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit
D2 Dearborn Div., Sharon Steel Corp.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Stee lCorp., Follansbee, W. Va.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Stee lProducts Div., Milton, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Ca.
P10 Precision Drawn Steel Co., Camden,
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A. Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Stee Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Stee' Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & W re Co., Chicago
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	7.25	+8.00	10.25	+4.00	13.75	0.50	16.25	1.25	16.75	2.25	17.25	2.75	18.75	2.50								
Youngstown *R3*	9.25	+10.00	12.25	+6.00	15.75	+1.50	18.25	0.25	18.75	1.25	19.25	1.75	20.75	2.50								
Fontana *K1*	+3.75	+23.00	0.75	+19.00	2.75	+14½	5.25	+12¾	5.75	+11¾	6.25	+11.25	7.75	+10.50								
Pittsburgh *J3*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25	5.25	+20.25	1.25	+16.50	3.75	+13.00	5.25	+11.50
Alton, Ill. *L1*	7.25	+8.00	10.25	+4.00	13.75	0.50	16.25	1.25	16.75	2.25	17.25	2.75	18.75	2.50								
Sharon *M3*	9.25	+10.00	12.25	+2.00	15.75	+1.50	18.25	0.25	18.75	1.25	19.25	1.75	20.75	2.50								
Fairless *N2*	7.25	+8.00	10.25	+4.00	13.75	0.50	16.25	1.25	16.75	2.25	17.25	2.75	18.75	2.50								
Pittsburgh *N1*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25	5.25	+20.25	1.25	+16.50	3.75	+13.00	5.25	+11.50
Wheeling *W5*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25								
Wheatland *W4*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25								
Youngstown *Y1*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25	5.25	+20.25	1.25	+16.50	3.75	+13.00	5.25	+11.50
Indiana Harbor *Y1*	8.25	+9.00	13.25	+2.00	14.75	1.50	17.25	2.25	17.75	3.25	18.25	3.75	19.75	4.25								
Lorain *N2*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25	5.25	+20.25	1.25	+16.50	3.75	+13.00	5.25	+11.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	11.75	+2.00	15.75	2.00	18.75	6.50	19.25	5.25	19.75	6.25	20.25	6.75	20.75	5.50								
Youngstown *R3*	13.75	+4.00	17.75	list	20.75	4.50	21.25	4.25	21.75	5.25	22.25	5.75	22.75	5.50								
Fairless *N2*	11.75	+2.00	15.75	2.00	18.75	6.50	19.25	5.25	19.75	6.25	20.25	6.75	20.75	5.50								
Fontana *K1*	0.75		4.75		7.75		8.25		8.75		9.25		9.75									
Pittsburgh *J3*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+10.50	11.25	+5.50
Alton, Ill. *L1*	11.75	+2.00	15.75	2.00	18.75	6.50	19.25	5.25	19.75	6.25	20.25	6.75	20.75	5.50								
Sharon *M3*	13.75	+4.00	17.75	list	20.75	4.50	21.25	4.25	21.75	5.25	22.25	5.75	22.75	5.50								
Pittsburgh *N1*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+10.50	11.25	+5.50
Wheeling *W5*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50								
Wheatland *W4*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50								
Youngstown *Y1*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+10.50	11.25	+5.50
Indiana Harbor *Y1*	12.75	+1.00	16.75	3.00	19.75	7.50	20.25	6.25	20.75	7.25	21.25	7.75	21.75	6.50								
Lorain *N2*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+10.50	11.25	+5.50

Threads only, buttweld and seamless 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.50¢ per lb.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.68	T-1
18	4	1	—	5	2.385	T-4
18	4	2	—	—	1.185	T-2
1.5	4	1.5	8	—	1.04	M-1
6	4	3	6	—	1.43	M-3
6	4	2	5	—	1.185	M-2

High-carbon chromium . . .83 D-3, D-5
Oil hardened manganese .45 O-2
Special carbon 41 W-1
Extra carbon 345 W-1
Regular carbon 29 W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*A3, J2, L4*) 10 pct	Plate (*A3, J2, L4*) 15 pct	Plate (*A3, J2, L4*) 20 pct	Sheet (*I2*) 20 pct
Stainless Type	302				35.50
	304	34.60	38.00	41.50	37.75
	316	39.70	43.20	46.65	55.50
	321	36.35	39.80	43.50	44.75
	347	39.50	43.95	48.45	54.25
	405	29.20	33.15	37.05	
	410, 430	28.70	32.65	36.55	

CR Strip (S9) Copper, 10 pct, 2 sides, 40.35; 1 side, 33.50.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	9.00	9.20	
Armature	10.35	10.35	10.85
Elect.	11.00	11.025	11.525
Motor	12.05	12.075	12.575
Dynamo	13.05	13.05	13.55
Trans. 72	14.05	14.05	14.55
Trans. 65	14.60	Grain Oriented	
Trans. 58	15.10	Trans. 80	18.50
Trans. 52	16.15	Trans. 73	19.00

Producing points: Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*U1*); Warren, O. (*R3*) 20¢ higher, HR; Zanesville, Butler (*A7*).

LAKE SUPERIOR ORES

51.50% Fe natural content, delivered lower Lake ports. Prices for 1957 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld Col	Merch. Wire Galv. ¢/lb.	¢/lb.
Alabama City *R3*	167	181		195	187	8.10	8.50
Aliquippa, Pa. *J3***	164	179			181	7.95	8.475
Athens *A8***	166	182		192	190	8.05	8.65
Bartonville *K2***	166	182		192	190	8.05	8.65
Buffalo *W6*						8.10	8.50
Chicago, Ill. *N4***	164	180	167	190	188	7.95	8.55
Cleveland *A6*	173					8.10	
Cleveland *A5*						7.95	
Crawfordsville *M4***	166	182		192	190	8.05	8.65
Donora, Pa. *A5*	164	176		190	184	7.95	8.35
Duluth *A5*	164	176		190	184	7.95	8.35
Fairfield, Ala. *T2*	164	176		190	184	7.95	8.35
Galveston *D4*	188‡						
Houston *S2*	169	181		195	189	8.20	8.60
Johnstown, Pa. *B3*****	164	180	167		188	7.95	8.55
Joliet, Ill. *A5*	164	176		190	184	7.95	8.35
Kokomo, Ind. *C9**	166	178		192	186	8.05	8.45
Los Angeles *B2***						8.90	9.50
Kansas City *S2**	169	181		195	189	8.20	8.60
Minnequa *C6*†	169	181	172	195	189	8.20	8.60
Monessen *P6*	167	185			191	8.10	8.10
Pittsburg, Cal. *C7*	186	199			204	8.90	9.30
Portsmouth *P7*						7.95	
Rankin, Pa. *A5*	164	176			184	7.95	8.35
So. Chicago *R3*	167	181		195	187	8.10	8.50
S. San Francisco *C6*				214		8.90	9.30
Sparrows Pt. *B3***	166			192	190	8.05	8.65
Struthers, O. *Y1**						7.95	8.45
Worcester *A5*	170					8.25	8.65
Williamsport, Pa. *S5*			175				

* Zinc less than .10¢. † Plus zinc extras.
** 13.5 zinc. ‡ Wholesalers only.
*** .10¢ zinc.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Baltimore, Md. *T8*	8.25	10.10	12.30	15.30	18.25
Bristol, Conn. *W12*			12.30	15.30	18.25
Boston *T8*	8.50	10.10	12.30	15.30	18.25
Buffalo, N. Y. *R7*	7.95	9.80	12.60	15.00	17.95
Carnegie, Pa. *S9*	‡	9.80	12.00	15.00	
Cleveland *A5*	7.95	9.80	12.00	15.00	17.95
Detroit *D1*	8.75	10.20	12.40	15.40	
Detroit *D2*	8.75	10.20	12.40		
Dover, O. *G4*	7.95	9.80	12.00	15.00	17.95
Franklin Park, Ill. *T8*	8.05	9.80	12.60	15.00	17.95
Harrison, N. J. *C11*			12.30	15.30	18.25
Indianapolis *C5*	8.10	9.95	12.60	15.00	17.95
New Castle, Pa. *B4*	7.95	9.80	12.60	15.00	
New Haven, Conn. *D1*	9.10	10.40	12.60	15.60	
Pawtucket, R. I. *N7*	8.50	10.10	12.30	15.30	18.25
Pittsburgh *S7*	7.95	9.80	12.60	15.00	17.95
Riverdale, Ill. *A1*	8.05	9.80	12.00	15.00	17.95
Sharon, Pa. *S1*	8.65	10.10	12.30	15.30	18.25
Trenton *R9*		10.10	12.90	15.30	18.25
Wallingford *W1*	8.40	10.10	12.30	15.30	18.15
Warren, Ohio *T4*	7.95	9.80	12.60	15.00	17.95
Weirton, W. Va. *W3*	7.95	9.80	12.60	15.00	17.95
Worcester, Mass. *A5*	8.50	10.10	12.30	15.30	18.25
Youngstown *C5*	7.95	9.80	12.60	15.00	17.95

‡ On Application.

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	34.88	40.85	33.21	.....
	2½	12	46.98	55.01	44.73	.....
	3	12	54.24	63.53	51.66	.....
	3½	11	63.32	74.16	60.30	.....
	4	10	84.09	98.47	80.07	.....
National Tube	2	13	34.88	40.85	33.21	.....
	2½	12	46.98	55.01	44.73	.....
	3	12	54.24	63.53	51.66	.....
	3½	11	63.32	74.16	60.30	.....
	4	10	84.09	98.47	80.07	.....
Pittsburgh Steel	2	13	34.88	40.85	.....	.....
	2½	12	46.98	55.01	.....	.....
	3	12	54.24	63.53	.....	.....
	3½	11	63.32	74.16	.....	.....
	4	10	84.09	98.47	.....	.....

WAREHOUSES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets: Hot-Rolled (18 ga. & hvr.)	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Bars: Hot-Rolled (special quality)	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		8.17	9.37	9.83	8.21	8.55	8.59	8.30	.....	10.23	.....	.....	.....	.....
Baltimore	$.10	7.79–7.98	8.99–9.08	9.12	8.27–8.46	8.12–8.36	8.57–8.85	8.34–8.48	.....	9.09–9.23	14.99	14.44	18.39	18.09
Birmingham	.15	7.68–7.80	8.88–9.00	8.85	7.78–7.82	8.01	8.05–8.20	7.91	8.44	10.04–10.12	.....	.....	.....	.....
Boston	.10	8.94	9.83–9.98	11.16	8.89–8.99	9.28	9.20	9.02	9.57	10.71–10.81	15.05	14.59	18.51	18.24
Buffalo	.15	8.00	9.15	10.90	8.20	8.65	8.65	8.40	8.85	8.85	15.00	14.45–14.50	18.40	18.10
Chicago	.15	7.80	9.00	9.85	7.82–7.97	8.31	8.20–8.35	8.22	8.44–8.59	8.50	14.65	14.10	18.05	17.75
Cincinnati	.15	8.09	9.20	9.90	8.29	8.67	8.89	8.37	8.87	8.99	14.93	14.38	18.33	18.03
Cleveland	.15	7.93	9.13	9.75	8.07	8.54	8.72	8.31	8.67	8.75	14.73	14.18	18.13	17.14–17.83
Denver		9.55	11.09	12.41	9.70	9.80	9.60	9.75	.....	10.54	.....	.....	.....	19.79
Detroit	.15	8.18	9.40	11.70	8.32	8.66	8.89	8.36	8.86	8.83	.....	14.36	.....	18.01
Houston		8.80	9.75	.....	8.85	8.80	9.10	9.00	.....	10.65	15.50	.....	19.30	19.05
Kansas City	.20	8.52	9.72	10.07	8.60	8.83	8.87	8.73	.....	9.42	15.32	14.77	18.72	18.42
Los Angeles	.10	9.00–9.20	10.75–10.90	11.75	9.20–9.25	9.45	9.05	8.90	9.60	11.80	15.85	15.35	19.70	19.45
Memphis	.15	8.02	9.22	.....	8.12	8.35	8.39	8.25	.....	9.85	.....	.....	.....	.....
Milwaukee	.15	8.08	9.28	9.97	8.10	9.75	9.25	8.35	8.71	8.72	14.77	14.22	18.17	17.87
New York	.10	8.55	9.76	10.33	9.00	9.11	9.01	8.96	9.48	10.75	15.02	14.49	18.42	18.14
Norfolk	.20	8.00	.....	.....	8.40	8.35	8.70	8.45	.....	10.70	.....	.....	.....	.....
Philadelphia	.10	8.25	9.17	10.22–10.39	8.68–8.92	8.78	8.80	8.65	9.18	9.41	14.80	14.41	18.29	18.06
Pittsburgh	.15	7.93	9.14	10.20	7.88–8.07	8.31	8.35	8.22	8.59	8.75	15.20	14.10	18.55	17.75
Portland		8.90	9.65	11.40	10.25–11.05	9.00	9.35	8.95	.....	13.55	16.70	16.10	20.40	20.25
San Francisco	.10	9.05	10.40	10.90	9.05	9.30	9.15	8.90	9.45	12.40	15.85	15.35	19.70	19.45
Seattle		9.35–9.55	10.45–10.70	11.55–11.65	9.50	9.30	9.15–9.35	9.30	9.85	13.15–13.30	16.55	15.55–15.65	19.50	19.20
Spokane	.15	9.50–9.70	10.60–10.85	11.80	9.70	9.20–9.45	9.30–9.50	9.45	10.00	13.30	.....	16.55	.....	20.10
St. Louis	.15	8.54	9.74†	10.21	8.34	8.67	8.82	8.58	8.96	9.08–9.11	14.83–14.98	14.43–14.46	18.23–18.38	18.08–18.11
St. Paul	.15	8.29	9.64	10.31	8.39–8.58	8.71–9.05	8.75–9.09	8.52	.....	9.21	.....	14.62	.....	18.27

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.
† 16 gage. †† 13½¢ zinc. ‡ Deduct for country delivery.

(Effective Feb. 19, 1957)

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.075	6.00	6.35				
So. Chicago *R5*				8.775			
Enaley *T2*	5.075	6.00					
Fairfield *T2*		6.00		8.775		6.025	
Gary *U1*	5.075	6.00				6.025	
Huntington *C16*		6.00					
Ind. Harbor *I3*	5.075		6.35	8.775		6.025	
Ind. Harbor *Y1*				8.775			
Johnstown *B3*		6.00					
Joliet *U1*	5.075		6.35				
Kansas City *S2*				8.775			
Lackawanna *B3*	5.075	6.00	6.35			6.025	
Lebanon *B3*							5.49
Minnequa *C6*	5.075	6.50	6.35	8.775		6.025	13.10
Pittsburgh *P5*				8.775	12.85		
Pittsburgh *J3*				8.775			13.10
Seattle *B2*				9.275		6.175	13.16
Steelton *B3*	5.075		6.35			6.025	13.10
Struthers *Y1*				8.775			
Torrance *C7*							
Williamsport *S5*		6.15					
Youngstown *R3*				8.775			

COKE

Furnace, beehive (f.o.b. oven) Net-Ton
Connellsville, Pa. . . . $15.00 to $15.75
Foundry, beehive (f.o.b. oven)
$17.50 to $19.00

Foundry oven coke

Buffalo, del'd	$31.75
Detroit, f.o.b.	30.50
New England, del'd	31.55
Kearney, N. J., f.o.b.	30.00
Philadelphia, f.o.b.	29.50
Swedeland, Pa., f.o.b.	29.50
Painesville, Ohio, f.o.b.	30.50
Erie, Pa., f.o.b.	30.50
Cleveland, del'd	32.65
Cincinnati, del'd	31.84
St. Paul, f.o.b.	29.75
St. Louis, f.o.b.	31.50
Birmingham, f.o.b.	28.85
Milwaukee, f.o.b.	30.50
Lone Star, f.o.b.	25.50
Neville, Is., Pa.	29.25

ELECTRODES

Cents per lb f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	24.75	40	100, 110	10.70
20	72	24.00	35	110	10.70
16 to 18	72	24.50	30	110	10.85
14	72	25.00	24	72 to 84	11.25
12	72	25.50	20	90	11.00
10	60	26.50	17	72	11.40
10	48	27.00	14	72	11.85
7	60	26.75	12	60	12.95
6	60	30.00	10	60	13.00
4	40	33.25	8	60	13.30
3	40	35.25			
2½	30	37.25			
2	24	57.75			

* Prices shown cover carbon nipples.

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper
Cast elliptical, 18 in. or longer, 5000 lb lots 53.42
Electrodeposited 43.28
Brass, 80-20, ball anodes, 2000 lb or more 54.00
Zinc, ball anodes, 2000 lb lots 21.25
(for elliptical add 2¢ per lb)
Nickel, 99 pct plus, rolled carbon, 5000 lb $1.0225
(rolled depolarized add 3¢ per lb)
Cadmium $1.70
Tin, ball anodes and elliptical $1.07 per in.

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum 77.50
Copper sulphate, 100 lb bags, per cwt. 26.65
Nickel salts, single, 100 lb bags . . 40.50
Nickel chloride, freight allowed, 300 lb 45.50
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums 23.05
(Philadelphia price 23.30)
Zinc cyanide, 100 to 900 lb 55.55
Potassium cyanide, 100 lb drum N. Y. 48.00
Chromic acid, flake type, 1 to 20 100-499 lb drums 31.75

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)
Pct Discounts

Machine and Carriage Bolts	Full Container Price	30 Containers	20,000 Lb.	40,000 Lb.
½" and smaller x 6" and shorter	55	58½	60½	61½
⅝" thru 1" x longer than 6"	46½	50	52½	54
Rolled thread carriage bolts ½ in. & smaller x 6 in. and shorter	55	58½	60½	61½
Lag, all diam. x 6" & shorter	55	58	60	61
Lag, all diam. longer than 6 in.	47	50	52	53
Plow bolts, ½" and smaller x 6" and shorter	54	57½	59	60

(Add 25 pct for broken case quantities)

Nuts, Hex, HP reg. & hvy.	Full Case or Keg Price
¾ in. or smaller	63
⅞ in. to 1 in. inclusive	59½
1⅛ in. to 1½ in. inclusive	64
1⅝ in. and larger	58

C. P. Hex reg. & hvy.

¾ in. and smaller	63
⅞ in. to 1½ in. inclusive	59½
1⅝ in. and larger	58

Hot Galv. Nuts (All Types)

¾ in. and smaller 50

Semi-finished Hex Nuts

¾ in. or smaller	63
⅞ in. to 1½ in. inclusive	59½
1⅝ in. and larger	58

(Add 25 pct for broken case or keg quantities)

Finished

1 in. and smaller 65

Rivets

Base per 100 lb
½ in. and larger $10.85
Pct Off List
7/16 in. and smaller 26½

Cap Screws

Discount (Packages)
Bright Treated H. C. Heat

New std. hex head, packaged ⅝" diam. and smaller x 6" and shorter	47	34
¾", ⅞" and 1" diam. x 6" and shorter	31	13
⅝" diam. and smaller x longer than 6"	18½	+ 1
¾", ⅞" and 1" diam. & longer than 6"	5½	+19½

C-1018 Steel

	Full-Finished Cartons	Bulk
¼" through ⅝" dia. x 6" and shorter	47	63
¾" through 1" dia. x 6" and shorter	31	51½

Minimum quantity—¼" through ⅜" diam., 15,000 pieces; 1/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

Plain Finish	Discount Mach. Screws	Discount Stove Bolts
Cartons	19	32
Bulk *Quantity*		
To ¼" diam. incl. 25,000-200,000	9	54
5/16 to ½" diam. incl. 15,000-100,000	9	54
All diam. over 3" long 5,000-100,000	—	54

Machine Screw & Stove Bolt Nuts

	Discount Hex	Discount Square
In cartons	16	19
Quantity		
In Bulk ⅜" diam. & smaller 15,000-100,000	7	9

CAST IRON WATER PIPE INDEX

Birmingham	119.0
New York	131.7
Chicago	134.1
San Francisco-L. A.	140.2

Dec. 1955 value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$128.00
No. 1 Ohio	128.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	114.00
No. 2 Ohio	98.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $2.00)	20.00

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$140.00
Childs, Hays, Pa.	145.00
Chicago District	150.00
Western Utah	144.00-165.00
California	170.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	150.00-157.00
Silica cement, net ton, bulk, Latrobe	26.50
Silica cement, net ton, bulk, Chicago	24.00
Silica cement, net ton, bulk, Ensley, Ala.	25.50
Silica cement, net ton, bulk, Mt. Union	23.00
Silica cement, net ton, bulk, Utah and Calif.	35.00

Chrome Brick *Per net ton*

Standard chemically bonded, Balt.	$98.00
Standards chemically bonded, Curtiner, Calif.	108.00
Burned, Balt.	92.00

Magnesite Brick

Standard, Baltimore	$121.00
Chemically bonded, Baltimore	109.00

Grain Magnesite St. ⅜ to ½-in. grains

Domestic, f.o.b. Baltimore in bulk	$69.40
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.	
in bulk	43.00
in sacks	49.00

Dead Burned Dolomite *Per net ton*

F.o.b. bulk, producing points in:	
Pa., W. Va., Ohio	$16.00
Midwest	16.35
Missouri Valley	15.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh

Swedish sponge iron f.o.b. Riverton, N. J., ocean bags	8.50¢
Canadian sponge iron, Del'd in East, carloads	9.5¢
Domestic sponge iron, 98+% Fe, carload lots	8.5¢
Electrolytic iron, annealed, imported 99.5+% Fe	27.5¢
domestic 99.5+% Fe	36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+% Fe	57.0¢
Electrolytic iron melting stock, 99.84% pure	22.0¢
Carbonyl iron size 5 to 10 micron, 98%, 99.8+% Fe	86.0¢ to $1.55
Aluminum, freight allowed	38.00¢
Brass, 10 ton lots	37.50¢ to 50.00¢
Copper, electrolytic	49.75¢
Copper, reduced	49.75¢
Cadmium, 100-199 lb, 95¢ plus metal value	
Chromium, electrolytic 99.85% min. Fe .03 max. Del'd	$5.00
Lead	8.90¢ plus metal value
Manganese	70.0¢
Molybdenum, 99%	$3.60 to $3.95
Nickel, unannealed	$1.00
Nickel, annealed	$1.06
Nickel, spherical, unannealed #80	$1.13
Silicon	43.50¢
Solder powder 7.0¢ to 9.0¢ plus met. value	
Stainless steel, 302	99.0¢
Stainless steel, 316	$1.32
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh)	$4.20
Zinc, 10 ton lots	18.75¢ to 32.50¢

Ferroalloy Prices

(Effective Feb. 19, 1957)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr. .30-1.00% max. Si.

0.02% C	41.50	0.20% C	38.50
0.03% C	41.00	0.50% C	38.25
0.06% C	39.50	1.00% C	37.50
0.10% C	39.00	1.50% C	37.35
0.15% C	38.75	2.00% C	37.25

4.00-4.50% C, 67.70% Cr, 1-2% Si ... 27.75
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si ... 27.75
0.025% C (Simplex) ... 34.75
0.10% C, 50-52% Cr, 2% max Si ... 35.75
8.50% max. C, 50-55% Cr, 3-6% Si ... 24.00
8.50% C, 50-55% Cr, 3% max Si ... 24.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max 0.10% C price schedule. Add 5¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.31
0.50% max. C	1.31
9 to 11% C, 33-91% Cr, 0.75% Fe	1.40

Electrolytic Chromium Metal

Contract prices per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	$1.29
Ton lots	1.31
Less ton lots	1.33

Low Carbon Ferrochrome Silcon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Contract price, carloads, delivered, lump, 3-in. x down, per lb of Cr, packed.

Carloads	44.65
Ton lots	48.95
Less ton lots	51.45

Calcium-Silicon

Contract price per lb of alloy, lump, delivered, packed.
30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads	25.65
Ton lots	27.95
Less ton lots	29.45

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	24.25
Ton lots	26.15
Less ton lots	27.15

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	20.15
Less ton lots	21.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	17.20
Ton lots	18.70
Less ton lots	19.95

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.50
Ton lots to carload packed	19.65
Less ton lots	20.90

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	12.75
Johnstown, Pa.	12.75
Sheridan, Pa.	12.75
Philo, Ohio	12.75
S. Duquesne	12.75

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	14.80
Ton lots packed	17.20

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$100.50
19 to 21%	3% max.	102.50
21 to 23%	3% max.	105.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	33.00
Ton lots	35.00
250 to 1999 lb	37.00
Premium for Hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn ... 25.50

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	33.60	36.40	37.40
0.30% max. C	32.10	34.90	36.10
0.50% max. C	31.60	34.40	35.60
0.75% max. C, 80.85% Mn, 5.0-7.0% Si	28.60	31.40	32.60

Silicomanganese

Contract basis, lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carloads bulk	13.80
Ton lots	15.45
Briquet contract basis carloads, bulk, delivered, per lb of briquet	15.10
Ton lots, packed	17.50

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots	Carloads
96.50% Si, 2% Fe	23.95	22.65
98% Si, 0.75% Fe	24.45	23.15

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk	7.70
Ton lots, packed	10.50

Electric Ferrosilicon

Contract prices, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si	13.90	75% Si	16.80
65% Si	15.65	85% Si	18.50
	90% Si	19.90	

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrovanadium

50-55% V contract, basis, delivered, per pound, contained V, carloads, packed.

Openhearth	3.20
Crucible	3.30
High speed steel (Primos)	3.40

Alsifer, 20% Al, 40% Si, 40% Fe. Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	10.65¢
Ton lots	11.80¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound Contained Mo ... $1.28

Ferrocolumbium, 50-50%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots	$6.90
Less ton lots	6.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd ton lots, 2-in. x D per lb con't Sb plus Ta ... $4.95

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth Pa., per pound contained Mo ... $1.68

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton ... $90.00
10 tons to less carload ... $110.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb. contained Ti ... $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti ... $1.50
Less ton lots ... $1.55

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton ... $215.00

Ferrotungsten, ¼ x down, packed, per pounds contained W, ton lots delivered ... $3.15

Molybdic oxide, briquets, per lb contained Mo, f.o.b. Langeloth, Pa. ... $1.41
bags, f.o.b. Washington, Pa., Langeloth, Pa. ... $1.33

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk lump	18.50¢
Ton lots, packed lump	20.50¢
Less ton lots	21.00¢

Vanadium oxide, 86-89% V_2O_5 contract, basis, per pound contained V_2O_5 ... $1.38

Zirconium contract basis, per lb of alloy
35-40% f.o.b. freight allowed, carloads, packed ... 27.25¢
12-15%, del'd lump, bulk-carloads ... 9.25¢

Baron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload ... $5.50

Bortam, f.o.b. Niagara Falls,

Ton lots per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5% f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ... 14.00¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots ... 1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up

10 to 14% B	.85
14 to 19%	1.20
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa., freight, allowed, 100 lb and over

No. 1	$1.05
No. 79	50¢

Manganese - Boron, 75.00% Mn, 15.20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots	$1.46
Less ton lots	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots ... $2.15

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THE CLEARING HOUSE

News of Used and Rebuilt Machinery

Why the Worry? . . . Mild pessimism among used tool dealers just isn't proved out by sales figures. With a few exceptions, tool dealers are doing as well in February as they did in January. And for a number, January and even December, were top output months. Nonetheless, there's some degree of pessimism.

Most of it seems based on hearsay and press reports of slowing business levels in the automotive industry rather than on used machine sales books. Although rebuilders report backlogs of no more than 30-60 days, this figure is no lower than it was last year. Rebuilt tool backlogs have tended to run lower in the present boom period than they did during the white-hot scramble for machine tools in the Korean War period.

Now You See It . . . The same is true for used tool sellers of "as is" and reconditioned equipment. There are even purchases made by buyers who order the equipment, often sight unseen, by telephone. It's still difficult to get the more marketable, newer used equipment. And it's still necessary to comb out-of-area used tool markets to find equipment for resale in the immediate Chicago area.

Some Up, Some Down . . . As a general rule, February sales seem to be running at January levels. If there are dealers who are selling less equipment now than then, so there are also equipment dealers who are selling more now than then. There have been few concessions on price, usually one of the best indications of weakening in the used tool market. And smaller shops, generally first hit by a real cutback in used tool buying by the metalworking industry, report they are at least doing as well as larger firms with a wider variety of equipment in inventory.

If there's any indication of a dropoff in future business it's in the inquiry rate. This has been weakening slightly since the beginning of the month and the drop in inquiries has even affected the outlook for machine tool rentals.

Inventories Low . . . On the other hand it's virtually impossible to locate any strong inventories of sheet metalworking equipment, radial drills, milling machines, and heavy lathes. Even tool room equipment, which has proven very sensitive to pessimism in the business outlook in the past, is moving in strong volume and is not high in inventory among dealers.

Who Are Complainers? . . . However, there is some pessimistic talk. In actual fact, business is strong. Rebuilders are looking for some work, but are currently working at an extremely good level. The industry level generally is very strong, reflecting the record amount of new plant investment in the Chicago area.

Some of the complaint seems to come from dealers who are having trouble locating equipment their own customers are seeking. And this complaint is universal. Reported softness in machine tool sales in Detroit and points further east has done little to increase the available supply of equipment in the area. Reports of presses not selling easily are offset by an equal number of reports of buyers who are seeking a particular piece of press equipment.

No Crimp in Sales . . . Sinking inventories reported in October, November, December, and again in January, are not putting a real crimp on sales.

Used tool business, when there's equipment to sell, is good. There's no denying that some pessimism about the outlook has been expressed. But the fact remains, there's little in the actual volume of sales to suggest business is getting poorer. For some it's even getting better.

CONSIDER GOOD USED EQUIPMENT FIRST

BENDER—PIPE
6" U. S. Pipe Bender, Titan Model
BENDING ROLLS
4' x 3/16" Niagara Initial Type
10' x ½" Bertsch Initial Type
10' x ⅛" Kling Pyramid Type
10' x ⅝" Niles Pyramid Type
30' x ⅝" Niles Pyramid Type
BRAKES—LEAF TYPE
8' x 3/16" Dreis & Krump
12' x ¼" Dreis & Krump
BRAKES—PRESS TYPE
8' x ¼" Geo. A. Ohl
12' x 5/16" Cincinnati—NEW
CRANES—OVERHEAD ELECTRIC TRAVELING
5 ton R&M 40' Span 220/3/60 A.C.
Floor Control—New 1955
5 ton Whiting 48' Span 230/3/60 A.C.
5 ton Shaw 56' Span 230 Volt D.C.
10 ton P&H 38' Span 230 Volt D.C.
10 ton R&M 40' Span 220/3/60 A.C.
15 ton P&H 48' Span 230 Volt D.C.
15 ton Shepard Niles 51' Span 230 Volt D.C.
15 ton P&H 72' Span 230 Volt D.C.
35 ton Cleveland 70' Span 230/3/60 A.C.
With 10 ton Auxiliary
125 ton Niles 68' Span 440/3/60 A.C.
DRAW BENCH
10,000# Aetna Standard. Length of Draw 44'. Used to draw S.A.E. 1035 Welded Steel Tubing
FORGING MACHINES
1" to 5" Acme, Ajax, National
3" Acme Model XN, Air Clutch, NEW 1954
HAMMERS—BROAD DROP—STEAM DROP—STEAM FORGING—800 lb. to 20,000 lb.

LEVELER—STRETCHER
100 ton Hydr. Stretcher Leveler. Capy. .032" Ga. 36" Width, 96" Length; 4 Sheets in a Pack
LEVELLERS—ROLLER
37" Torrington, 19 Rolls 1-31/32" Dia., Backed up
48" Aetna Standard, 17 Rolls 3¾" Dia.
54" McKay, 17 Rolls, 2¾" Dia.
PLANER—PLATE EDGE
35' Southwark Pneumatic Holddowns, Motor Driven, Capacity 1½"
PRESSES—HYDRAULIC
750 ton Baldwin Triple Acting Bolster 84 x 133"
1200 ton United Steam Hydraulic Forging Press
4500 Baldwin-Lima-Hamilton Hydr. Forging Press.
PRESSES—STRAIGHT SIDE
Verson SI-40 200 ton 30" Stroke, Bed 40" x 44"
Bliss #8C 300 ton, 16" Stroke, Bed 44" x 83"
Toledo 203E Overhanging 10" Str. 38 x 40" Bolster
Cleveland IT-48 Toggle Press 200 ton, 20" x 14" Strokes, 34" Shut Height, Bolster 48" x 48"
PUNCH & SHEAR COMBINATIONS
Cleveland Style EF Single End, 42" Throat
Cleveland Style G Single End, 60" Throat
Cleveland Style W, 60" Throat
No. 1½ Buffalo Universal Ironworker
ROLLS—FORMING
18 Stand Roll Forming Machine, Shaft 2⅛" Dia. Will accommodate 36" wide sheet 16 ga. or up to 3/16" in narrower widths.
ROLLING MILLS
9" Bar Mill
18" Three High Bar Mill
10" x 14" Single Stand Two High
12" x 12" Single Stand Two High
12" x 16" Single Stand Two High
16" x 24" Farrel Two Stand, Two High
20" x 38" Single Stand Two High
26" x 72" Cold Rolling Mill
44" x 144" Three High Sheet Mill
22" x 40" Three High Sheet Mill
SHEAR—ALLIGATOR
No. 4 Mesta RH LK, Capacity 2" x 12"
SHEARS—BAR
No. 12 Buffalo Armor Plate
No. 22A Canton, Capacity 3" Rd., 2¾" Sq.
SHEARS—SQUARING
6' x 10" Ga. Niagara No. 672
62" x ¼" Peck Stow & Wilcox
8' x ¼" Niagara—NEW 1952
10' x ⅜" Niagara—NEW 1950
16' x 3/16" Long & Alstatter
SHEAR—MISC
Lowey Flying Shear with ratchet driven measuring rolls. Capacity .125" x 36" wide.
SLITTERS
12" Blake & Johnson
24" Blake & Johnson
36" Wean Slitting Line
STRAIGHTENER
Kane & Roach Type B, Capy. ⅞" Hex., Flat 4" x 11/32" Flat & Edge 1⅞" x 3/16"
SWAGING MACHINE
#6½A Fen. Capacity 2¼" Tube 3⅜" Solid 10" Die Length Hydraulic Feed. LATE
TESTING MACHINES
20,000# Baldwin Universal Hydraulic
60,000, 100,000, 200,000 Olsen & Riehle Universal
50,000 and 300,000 lb Compression
TUBE MILL
Etna 1K Welded Tube Mill, Cut-off & Transformer Capy. ⅛" OD 0.28 wall to 2" OD .120 wall

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(2)—100-HP Electro-Dynamic motors, 230-VDC, 450/1350 R.P.M., with 3-unit, 300-KW Allis-Chalmers M-G Set, 2300/440-Volt, 3 phase, 60 cycle.

SPECIAL

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Qu.	KW	Make	RPM	DC Volts	AC Volts
1	1500	G.E.	514	250	4000/2300
3	1000	Whse.	720	250	2300
2	500	Whse.	1200	125/250	2300
1	300	G.E.	1200	250/275	2300
1	300 (3-unit)	Al. Ch.	1200	250/300	2300
3	200	Whse.	1200	125/250	2300
3	150	Rel.	1200	125	2200
2	150	Whse.	1200	125/250	2300
1	150	G.E.	1200	250	4600/2300
1	100	Al. Ch.	1200	250	4600/2300
1	100	Whse.	720	125/250	2200
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3	1375	G.E.	MCF	415	1300
1	1000	G.E.	MCF	600	350/700
1	940	Whse.	QM	250	140/170
1	800	Whse.		300	250/550
		With United Gear Set 7:1 Ratio			
1	500	Whse.	CC-216	600	300/900
2	450	Whse.		550	415
2	300	G.E.	MPC	230	400
1	250	G.E.	MPC	230	400/600
1	200	Whse.	CB-5113	250	400/800
2	200	Whse.	CB-207.4	250	850/1200
1	150	G.E.	CD B.B.	600	250/700
1	150	Cr.Wh.	65-H	230	1150
2	125	Whse.	SK-185	230	350/1050
1	125	Whse.	SK-183	230	850
2	100	Whse.	SK-181	230	450/1000
1	60/100	G.E.	RF-17	230	450/900
2	75	Cr.Wh.	53H TEFC	230	860
1	50	G.E.	MD-412-AE	230	550
6	40	Rel.	385F TEFC BB	230	500/1500
2	30/40	Whse.	SK-131.5-BB DP	230	500/1500

MG SETS — 3 Ph. 60 Cy.

Qu	KW	Make	RPM	DC Volts	AC Volts
2	2000/2400	G.E.	450	250/300	2300/4600
1	2000	G.E.	500 25 cy.	680	11000
1	2000	G.E.	514	600	2300/4600
1	1500	G.E.	720	600	6600/13200
3	1000	G.E.	720	600	6600/13200
2	1000	G.E.	514	600	6600/13200
1	750	G.E.	720	125/250	2300/4600
1	500	G.E.	900	540/540	4150
1	500	Whse.	900	125/250	440
2	300	G.E.	1200	250	2300
2	300	Whse.	1200	275	440/2300
1	200	Whse.	1200	550	2300

TRANSFORMERS

Qu.	KVA	Make	Type	Ph.	Voltages
1	3000	A.C.	OISC	3	33000 x 2300
1	1500	G.E. auto	HT	3	4000/4200/4400
3	1000	G.E.	HVDDJ	1	2400 x 480
3	1000	G.E.	OA/FA	1	13800 x 230/460
1	833	G.E.	H	1	13800 x 460
2	750	G.E.	Pyranol	1	4800 x 85/55
3	500	Kuhl.	OISC	1	13200 x 6600
1	500	G.E.	OISC	1	13200 x 2300
1	500	G.E.	HS	1	13800 x 600
1	1000	G.E.	HT	3	4160 x 480/277
3	250	L.M.	OISC	1	13800 x 240/120
1	200	G.E.	AirCooled	3	432/480 x 120/208Y
3	150	G.E.	OISC		33000 x 2300/4000Y

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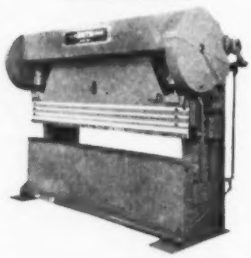

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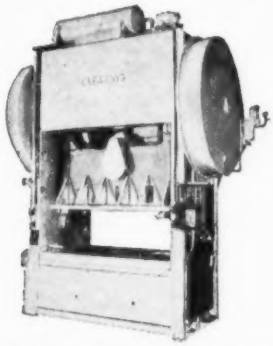

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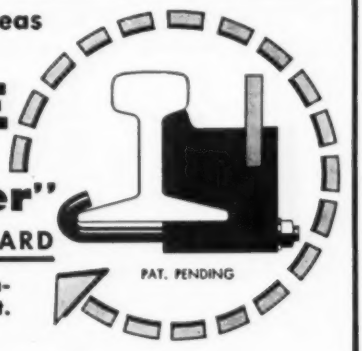

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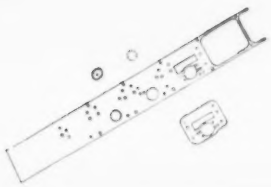

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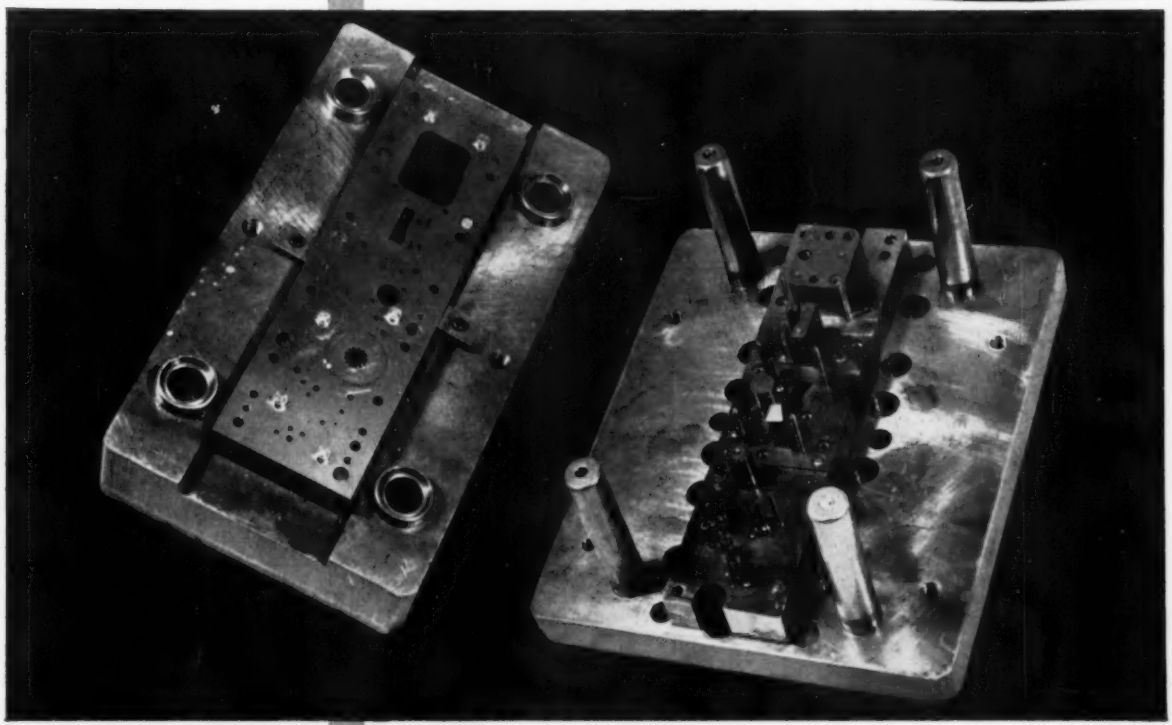

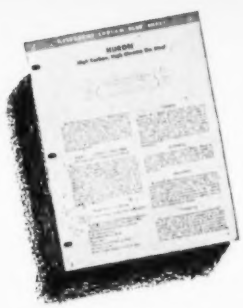

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Forecast Higher Stainless Output

Shipments of electrical sheet and strip by all producers in 1957 will equal or top the 813-000-ton showing of 1956, predicts E. J. Hanley, president of Allegheny Ludlum Steel Corp. Stainless steel, he says, will continue the rate of growth that has seen production jump from 500,000 ingot tons in 1946 to 1.2 million tons last year.

Chevrolet Holds Up On Construction

A proposed Chevrolet assembly plant at Lordstown, O., has been deferred indefinitely. Technical difficulties are responsible for the delay, says E. H. Kelly, Chevrolet's manufacturing manager. But General Motors has not canceled plans or sold its 1100 acres at Lordstown, he added.

Linde Strike Talks Bogged Down

One of the main issues stalling negotiations in the month-old Linde Air Products Co. strike is whether bargaining be done on a local or company-wide level. Federal Mediator William Rose says the company wants to bargain separately for each plant. Meanwhile, 1300 workers remain idle at Essington and Kittanning, Pa., and Tonawanda, N. Y.

New Hopper Cars For B&O

The Baltimore and Ohio Railroad ordered 200 seventy-ton covered hopper cars from Pullman-Standard Car Manufacturing Co., at a cost of about $1,700,000. Delivery is expected in the final quarter of this year.

Fewer Metalworking Mergers In 1956

The trend of corporate mergers in metalworking industries turned sharply downward in 1956, according to the Federal Trade Commission. There were 214 mergers last year compared to 268 in 1955. The drop was most pronounced in the primary metals category which had 29 mergers in 1956 compared to 59 the previous year.

GE Gets Union Pacific Engine Contract

A $15 million contract for 15 gas turbine-electric locomotives was placed with General Electric Co. by Union Pacific Railroad. A similar order was placed with GE by the railroad in December, 1955.

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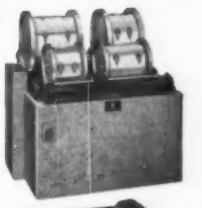

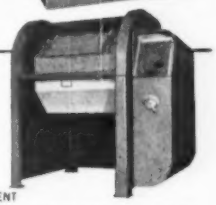

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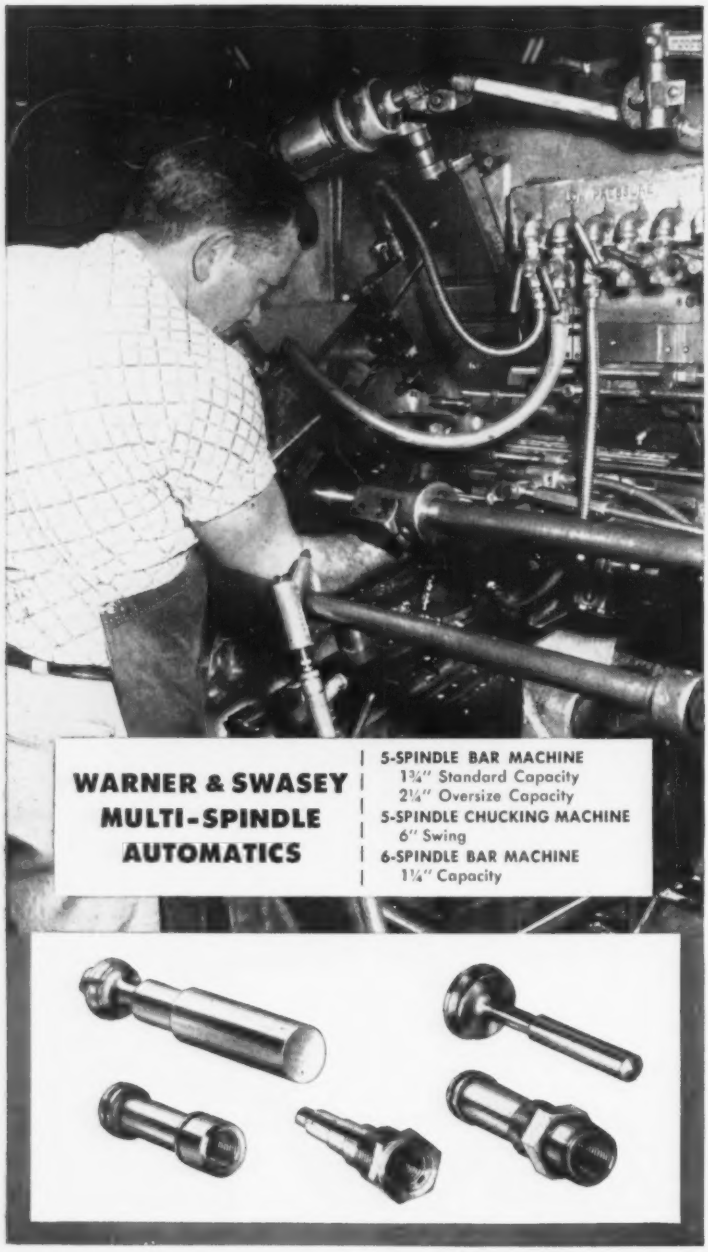
WARNER & SWASEY AUTOMATIC CUTS SMALL LOT COSTS...

solves inventory problem for Cleco Division, Reed Roller Bit Company



Cleco Division, Houston, Texas, manufactures a wide variety of air tools. About 6000 different component parts must be machined each year—and, in order to keep reasonable inventory, in relatively small lots ranging from 100 to 1000 pieces.

While production on small hand-operated turret lathes kept inventory in line, it resulted in too high a cost per piece. On the other hand, economical production on conventional automatics required larger lot sizes and higher inventories.

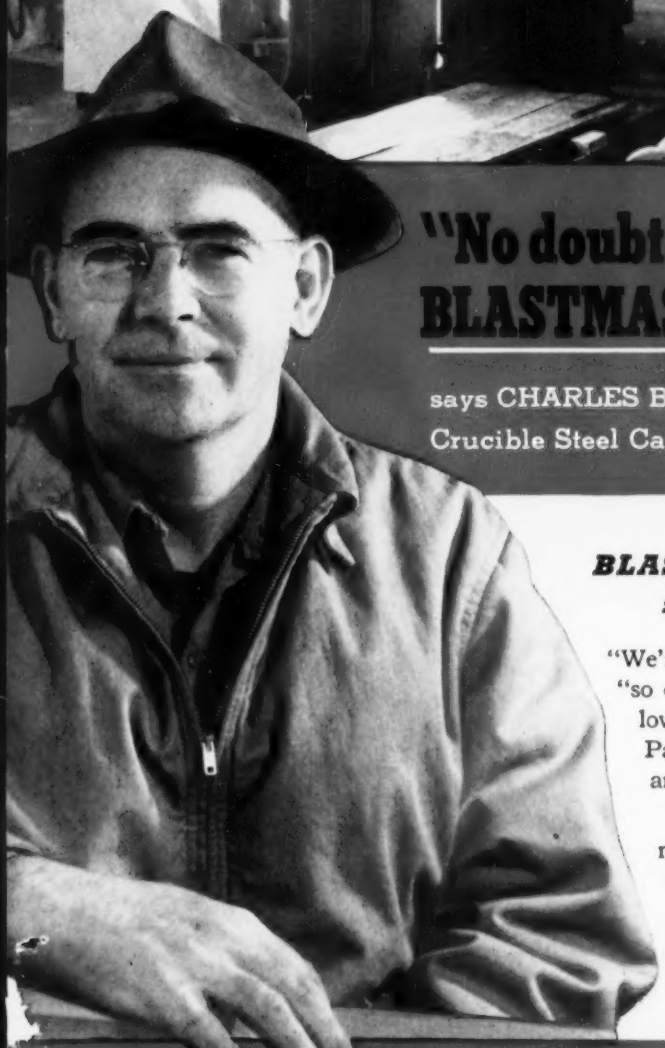
In 1948, Cleco installed a Warner & Swasey 5-Spindle Automatic to solve both these problems. Its quick setup permits machining small lots at automatic rates —reducing cost per piece, and inventory at the same time.

This automatic has been operated on a two-shift basis—the equivalent of 16 years of one-shift production—with an exceptionally low record of downtime. Only $144 has been spent for repair parts. And despite this usage, cross slide form cuts to within .002" are easily held.

Foreman O. R. Palmer says: "We handle as much of our short run work as possible on the Warner & Swasey. Only when there's more such work scheduled than the machine can accommodate do we route the surplus to other automatics." Cleco operators like the automatic's quick-set quadrants which eliminate cam changing for feed strokes, its micrometer-dial cross slide adjustment, and general ease of operation.

If you'd like to reduce your machining costs on small and medium lot production —as well as long runs—call in our Field Representative. He'll be able to tell you whether your work can be done more profitably on a Warner & Swasey Multi-Spindle Automatic.

YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS...WITH A WARNER & SWASEY



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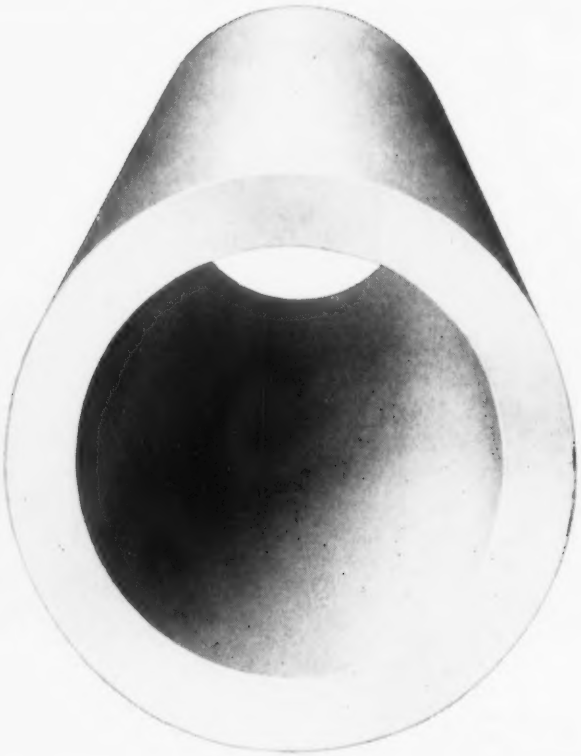
"We're interested in production figures," says Mr. Bachman, "so our blast cleaning equipment has to do good work at low cost. After studying the situation, we picked a Pangborn Blastmaster. It does the kind of job we like and its features are everything they're expected to be!"

If *you* need blast cleaning equipment, look at all makes. Then check the Pangborn Blastmaster. It offers many exclusive features plus a choice of sizes to fit your needs—1½, 3, 6, 12, 18 and 27 cu. ft. Write for Bulletin 225 to PANGBORN CORPORATION, 1500 Pangborn Boulevard, Hagerstown, Maryland.

Pangborn blast cleans cheaper

How to step up production of hollow parts



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MAKING hollow parts from bar stock slows down production. You have to bore out the center hole. That takes extra time, increases production costs. But with Timken® seamless steel tubing, *the hole's already there.* Finish boring is your first production operation. You save a big step—increase production, reduce costs. With less metal to machine away you get more parts per ton of steel.

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And to further increase your steel savings, Timken Company engineers will recommend the most economical tube size for your hollow parts job—a size guaranteed to clean up to your dimensions.

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